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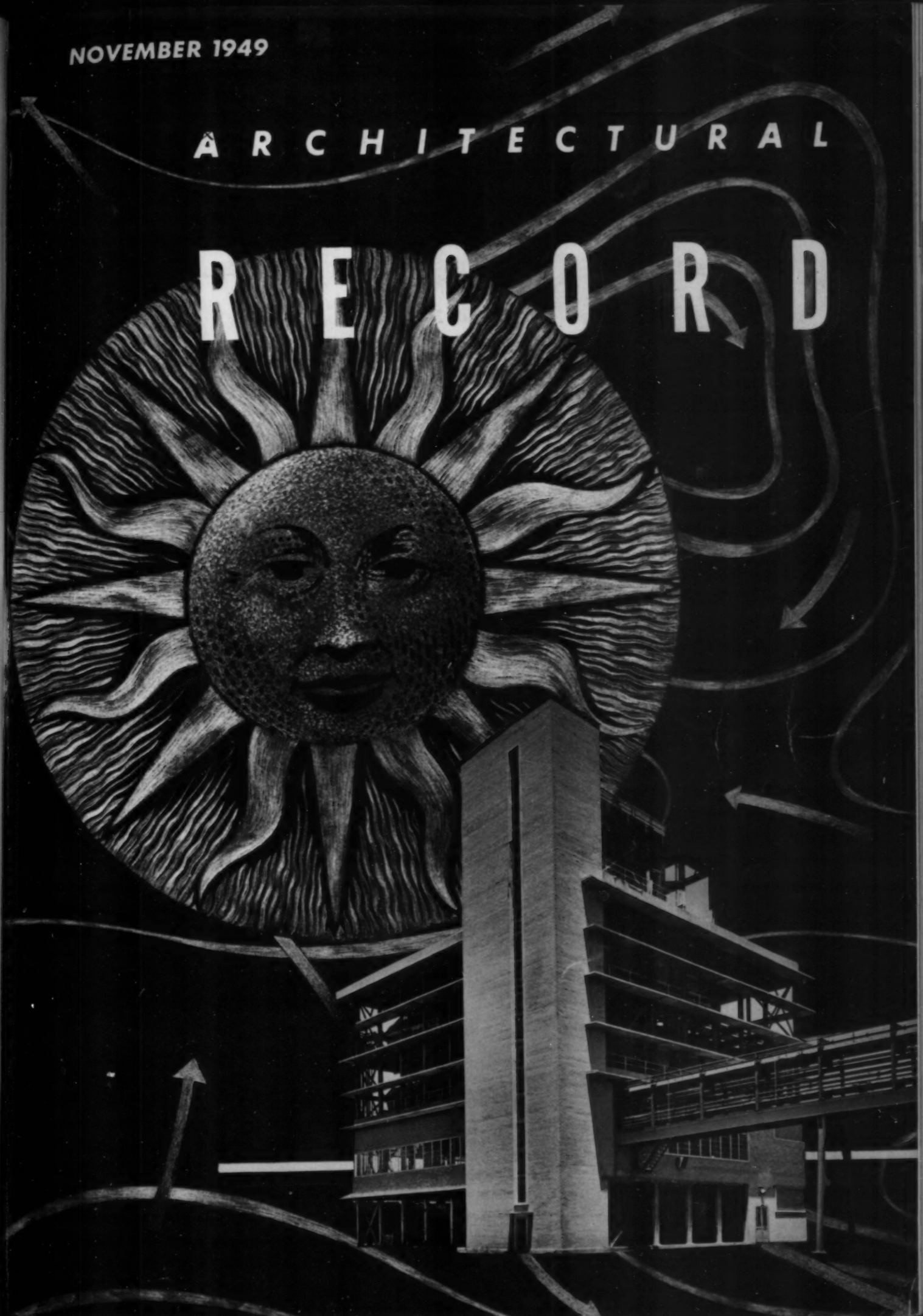
ARCHITECTURAL RECORD



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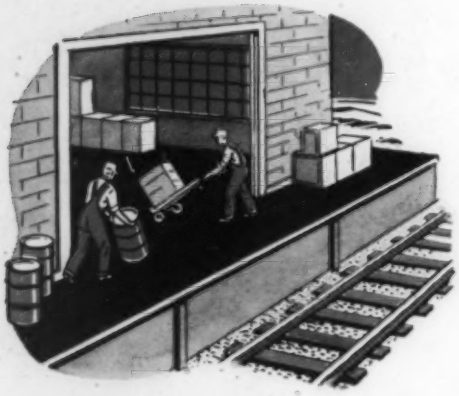

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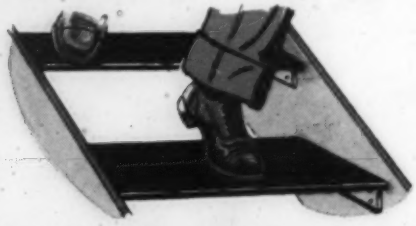

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THE RECORD REPORTS

CONSTRUCTION OUTLOOK FOR 1950

By Thomas S. Holden, President, F. W. Dodge Corporation

and Clyde Shute, Assistant Vice-President; Manager, Statistical Research Division

THE 1950 construction market will be a buyers' market. Restoration of normal competition is one phase of the current adjustment that may be said to be completed, in construction and in most other sectors of business.

Construction volume in 1950 will probably be very close to 1949 volume, odds favoring a moderate reduction in the total of contract dollars, rather than an increase.

This is equivalent to saying that the upturn in contract volume which took place in August and September of this year does not yet, in our opinion, show signs of being the beginning of a broad and sustained upswing.

If this appraisal is correct, it records a curious situation. The upturn in volume was accompanied by a firming of material prices and a leveling of construction costs, after twelve months of downward adjustment. In the past, attainment of a like degree of stabilization frequently constituted a base for broad expansion of the economy and a significant increase in construction activity. This was largely because a construction upturn represented in the main a return of private investment confidence. Today any appraisal must include guesses as to what big labor unions will do to key industries, what our own government will do, what impacts foreign economic conditions will have on American economy.

For this reason the opinions of qualified economists on the general economic outlook have assumed increased significance as background for estimating future construction trends. We find ourselves in substantial agreement with the majority of the views expressed by the 108 economists who contributed their opinions on the business outlook to F. W. Dodge Corporation's latest survey. They expect continuation of market readjustment in 1950 and moderate downtrends in wholesale commodity prices, cost of living, consumer spending, industrial and general business activity. A majority of them expect reduced volume of private nonresidential building and engineering contracts and increased volume of public nonresidential building and engineering contracts. While two-thirds of them expect reduced housing volume, the other third expects moderately increased housing activity.

While a prospect of a downtrend, however moderate, does not make exciting reading, it should be reassuring. The expected moderate downtrend is from a total contract volume which, in terms of dollars though not in terms of physical units, is likely to be the highest on record. By the end of September, 1949, the 37-states contract total recorded by Dodge had passed the dollar total recorded for the first nine months of 1948, with considerable likelihood that the fourth-quarter figures this year will exceed those of last year. Even this guess about the final quarter of this year is subject to the qualification that current strikes, if prolonged, could result in a serious setback between the date this is written and the end of December.

Our estimates are presented in Tables 1, 2, and 3, which do not require much detailed explanation.

The figures of Table 1 are presented in physical units, millions of square feet of new floor space, comparable to the floor space figures regularly recorded by Dodge.

For nonresidential building moderate declines are expected in classifications which depend principally upon private investment, moderate increases for those predominantly public. The most conspicuous figure is the 20 per cent drop estimated for religious buildings in 1950. This is a drop from peak volume; if realized, it would leave a volume which was exceeded only in the years 1948 and 1949. Commercial and manufacturing buildings, expected to decline slightly, are not likely to resume an upward trend until there is a decided uptrend in general business and industrial activity.

Considerations affecting the residential building prospect are mixed. Tending toward increasing activity are such factors as these: enormous consumer incomes, high level of personal savings, the recent re-entry of increased numbers of home buyers into the housing market after the lull of early 1949, the momentum of the current boom supported by favorable financing terms, the expected distribution of $2,800,000,000 to veterans as an insurance dividend in 1950. The enlarged public housing program, as authorized in the Housing Act of 1949, might temporarily increase the number of housing starts over the number that would otherwise be made, but will not, we believe, as a long-range proposition increase the total number of units that will be built.

Tending toward some curtailment of housing volume are the following factors: currently reduced numbers of new family formations below the 1947 peak will at some stage tend to reduce basic demand for new dwelling units; if rent control is finally abandoned in 1950, there is likely to be a considerable shifting of rental housing occupancy, with elimination of those artificial shortages that have resulted from rent control.

Tables 1 and 2 indicate an expected drop of 3 per cent in physical volume of new housing. This anticipates increased public, decreased private housing activity; it anticipates increased volume of private and public apartment building (most public housing projects will consist of multiple dwellings), approximately the same number of single-family houses built on owners' order for owners' occupancy as were so built this year, moderate reduction in single-family houses built by operative builders for sale or rent.

In Table 3 is given a summary of these estimates in terms of dollars, to which is added a breakdown between public and private work. In translating the floor space figures of Table 1 to the dollar figures of Table 3 it has been assumed that average square-foot costs in 1950 will be 4 per cent lower than average square-foot costs have been in 1949. In Table 3, dollar estimates for heavy engineering projects (public works and utilities) are included, showing an expected 5 per cent increase in 1950 over the high 1949 volume.

TABLE 1: ESTIMATED PHYSICAL VOLUMES OF BUILDING

(in accordance with contract records for 37 eastern states; figures in millions of square feet)

BUILDING CLASSIFICATION	ESTIMATE YEAR 1949*	ESTIMATE YEAR 1950	PERCENTAGE CHANGE
Commercial	87	83	− 5
Manufacturing	57	55	− 4
Educational and science	79	83	+ 5
Hospitals and institutional	42	43	+ 2
Public	8	8	0
Religious	25	20	−20
Social and recreational	21	22	+ 5
Miscellaneous nonresidential	21	19	−10
Total nonresidential	*340*	*333*	− *2*
Residential	489	474	− 3
Buildings incidental to heavy engineering projects	5	3	−
Total building	*834*	*810*	− *3*

TABLE 2: ESTIMATED NUMBERS OF NEW DWELLING UNIT STARTS

(in thousands)

	ESTIMATE YEAR 1949*	ESTIMATE YEAR 1950	PERCENTAGE CHANGE
Dodge coverage basis	435	422	− 3
BLS overall basis	935	907	− 3

TABLE 3: ESTIMATED DOLLAR VOLUMES OF BUILDING AND ENGINEERING CONTRACTS

(in accordance with 37-states contract statistics; figures in millions of dollars)

CLASSIFICATION	ESTIMATE YEAR 1949*	ESTIMATE YEAR 1950	PERCENTAGE CHANGE
TOTAL (PRIVATE AND PUBLIC OWNERSHIP)			
Nonresidential	3,580	3,370	− 6
Residential	3,950	3,680	− 7
Total building	*7,530*	*7,050*	− *6*
Public Works and Utilities	2,410	2,525	+ 5
Total Construction	*9,940*	*9,575*	− *4*
PRIVATE OWNERSHIP			
Nonresidential	2,404	2,118	−12
Residential	3,582	3,260	− 9
Total building	*5,986*	*5,378*	− *10*
Public Works and Utilities	392	362	− 8
Total Construction	*6,378*	*5,740*	− *10*
PUBLIC OWNERSHIP			
Nonresidential	1,176	1,252	+ 6
Residential	368	420	+14
Total building	*1,544*	*1,672*	+ *8*
Public Works and Utilities	2,018	2,163	+ 7
Total Construction	*3,562*	*3,835*	+ *8*

* *9 months actual, last three months estimated.*

NOTE — These dollar figures differ from those of the overall 48-state estimates of governmental agencies in three important particulars. (1) These figures cover 37 states; current volume in the 11 western states appears to be approximately one-third of 37-states volume. (2) These figures virtually represent work started; government overall figures are estimates of work put in place; trends shown by contract statistics generally tend to anticipate trends shown by work-in-place figures. (3) Government overall figures include estimated volume of low-valuation projects and projects in rural and semi-rural areas beyond the range of Dodge coverage.

There is obviously implied in the estimates here presented an expectation that construction trend curves, currently on the upswing, will take a dip some time next year, if indeed the current strike situation does not cause a sharp curtailment of activity before the end of 1949. Viewed from this date such a dip, if it comes about, would more likely be of the nature of a further market adjustment than the beginning of a major downtrend.

The 1950 construction picture sketched in this statement is somewhat blurred in outline. It is the kind of picture, we believe, which portrays the actual outlook more realistically than would a more striking statement of positive conviction that a definite postwar construction trend is emerging among the confusions of the time.

This indeterminate trend will change some day. It could change in the direction of a broad expansion of the American economy and the increased construction activity that almost inevitably attends such economic expansion. This consideration prompts us to add to our statement on the 1950 prospect some observations on potential long-term construction trends.

THE LONG-RANGE PROSPECT

United States population is growing rapidly; the high birth rate of the 1940's exceeded expectations of population experts. Babies born in the 1940's will need schools in the 1950's. They will be marrying and starting families and needing houses in the 1960's.

Recent studies by qualified authorities have shown that American resources and American productivity can conceivably support a much larger population at a considerably higher standard of living than it presently supports. (See "America's Needs and Resources," by J. Frederick Dewhurst and Associates; published by the Twentieth Century Fund, 1947: also, "Controlling Factors in Economic Development," by Harold G. Moulton, published by The Brookings Institution, 1949.)

Record breaking dollar totals of new construction in 1948 and 1949 did not represent record-breaking physical volume. The physical volumes of those two years were exceeded in the peak war year 1942 and, before that, in the peak years of the late 1920's.

In those earlier boom years the American people were investing 14 and 15 per cent of national income in new construction; in 1948 and 1949, only 8 per cent. Since V-J Day new construction has been undertaken largely to meet urgent current needs, very little for meeting the needs of the long-range future.

The construction industry could, with little difficulty, expand its activities well beyond its current volume or the

volume expected in 1950. Barring a shooting war, it is difficult to see any chance of material and manpower shortages, other than temporary ones, which would limit the volume of new construction the industry may be called upon to undertake. It is entirely a question of what the American economy will demand.

The American people can, if they choose, step up their construction expenditures very considerably. In 1948, the total of disposable personal income was an estimated $191,000,000,000. Of this, $12,000,000,000 was saved and about $179,000,000,000 spent for consumption goods and services. This represented more than a high standard of living; it meant luxurious living as compared with anything previously enjoyed by ourselves or by any other people. The total included unusually large expenditures for such durable goods as automobiles, house furnishings and equipment, radios and musical instruments, goods which were produced, if at all, in meager amounts during the war years.

Readjustments of 1949 have been accompanied by a very slight reduction in total personal income, which may suffer a further moderate decline in 1950. However, such vast spending power should provide ample margin for greater investment in capital facilities than has prevailed thus far since V-J Day.

For many years, the importance of overall growth of population, production and wealth (which is what we mean by the term "economic expansion") as the greatest stimulator of construction demand has been deeply studied and has been emphasized in numerous public statements by F. W. Dodge Corporation. We interpreted the great depression of the 1930's as an interruption in the nation's economic growth. As far back as 1938, Thomas S. Holden prepared and published a paper on "America's Capacity to Expand."

World War II was another interruption, but it served to sharpen the nation's productive tools and to enhance greatly its capacity for expansion on many fronts.

America is at the crossroads. Certain politicians and government planners are attempting to appropriate this great dynamic force (America's capacity to expand) and turn it into an instrumentality of the social welfare state. They are already telling the people that the way to reach the goal is through deficit spending and meticulous governmental guidance of industrial growth. History, if anyone can be persuaded to pay attention to it, will tell them that such a goal is reached, in a climate of maximum freedom, only through unity of purpose, hard work, thrift and intelligent investment of venture capital.

This subject is going to be widely discussed. A bill entitled "Economic Expansion Act of 1949" (S. 281) was introduced in the U. S. Senate last July 15 under the sponsorship of 18 Senators. We have not analyzed it, but we recommend that it and any similar proposals be read and studied, and that close attention be paid to any consideration Congress gives to its provisions.

New building and engineering facilities would be needed by the "welfare state." We believe that many more of them would be needed by the civilized society that Americans have been creating and can continue to create in an atmosphere of freedom.

Watch the deliberations of the 1950 session of the 81st Congress, next year's Congressional elections, the election campaign of 1952. The kind of future your country and your industry will enjoy will be the central subject of debate.

THE ECONOMIC OUTLOOK FOR NEXT YEAR: AN OPINION SURVEY

An Analysis by Norbert Brown, F. W. Dodge Corporation

WHAT is this country's economic outlook for 1950? This overall question, broken into its primary components, was recently put before a panel of 108 leading economists by F. W. Dodge Corporation — fifty-six of them connected with private business and financial institutions, fifty-two of them with colleges and universities. This opinion survey was made in the early part of October, in the form of a comprehensive mail questionnaire.

The principal conclusion to be drawn from the tabulated answers is that further readjustment will characterize the American economy between now and the middle of next year, with a moderate rise to follow during the latter part of next year.

Some respondents noted with their answers distinct reservations as to the contingency of extended duration of current coal and steel strikes. These reservations should be particularly borne in mind in interpreting the answers to questions 1, 2, and 3.

The particular ingredients making up this basic conclusion are the following: insignificant change in the physical volume of production, approximately stable civilian employment, moderate downward movements in the wholesale commodity price index and in the cost-of-living index, stability of wage scales in industry combined with increasing benefits equivalent to wage increases, and a moderate decline in total consumption expenditure.

A majority of the economists anticipates a decline from this year in the number of dwelling units to be built in 1950, and a decrease in private nonresidential building. These building declines will be counterbalanced to a degree by an increased dollar volume of public building and engineering work.

The questions and analysis of the answers follow:

Readjustment

1. Readjustment has characterized business activity generally during the past twelve months or so. What do you see ahead? *Analysis:* Predominant opinion (50.00%) is that there will be further readjustment for the remainder of 1949, though a substantial number (41.66%) expect a moderate rise. A majority (57.54%) expects that further readjustment will characterize business activity during the first half of next year, though many (36.79%) expect a moderate rise. A moderate rise is expected by most (50.50%) in the last half of 1950, with a diminishing number (35.35%) expecting further adjustment. *Conclusion:* Further readjustment will characterize American business activity between now and the middle of next year with a moderate rise to follow during the latter part of next year.

Physical Production

2. What about the physical volume of production? *Analysis:* Opinion as to physical production during the remainder of this year was mixed. The largest number (38.31%) expect a moderate decline, yet almost as many (33.64%) expect a moderate rise, and a substantial number (26.16%) foresee insignificant change. The median opinion, ranged from pronounced decline (1.86%) to pronounced rise (0.00%), was insignificant change.

As for the first half of next year, the largest number (41.12%) expect a moderate decline, while opinion was almost equally divided between those who foresee insignificant change (27.10%) and a moderate rise (29.90%). The median opinion, ranged from pronounced decline (1.86%) to pronounced rise (0.00%), was insignificant change.

That a moderate increase in physical production will be made in the last half of next year is expected by a substantial number (43.87%), although grouped together those expecting pronounced decline (4.08%), moderate decline (27.55%) or insignificant change (20.40%) constitute a bare majority, with insignificant

change being the median opinion in the range from pronounced decline (4.08%) to pronounced rise (4.08%). *Conclusion:* Insignificant change is to be expected in physical volume between now and the end of next year, with a reasonable expectation of moderate declines between now and mid-year 1950, and moderate rise in the last half of 1950.

Employment

3. What do you expect with respect to total civilian employment? *Analysis:* A definite majority (54.20%) expect civilian employment to remain approximately stable during the remainder of this year, while a substantial number (30.84%) expect a downward trend, and fewer still (14.95%) anticipate an upward movement in civilian employment.

Some falling off in civilian employment is expected by a substantial number (37.96%) in the first half of next year, although more expect employment to remain approximately stable (45.37%) and fewer (16.66%) anticipate an upward trend. The preponderant opinion is that civilian employment will remain approximately stable in the first half of next year.

A shift toward expectation of upward civilian employment (36.36%) in the last half of next year, as compared with the remainder of this year (14.95%) and the first half of next (16.66%) is noted, though the progression is counterbalanced by a sizable (35.35%) expectation of downward employment and a substantial (28.28%) expectation that employment will remain approximately stable. *Conclusion:* Civilian employment will remain approximately stable or decline during the remainder of this year and the first half of next, and remain approximately stable in the last half of next year.

Commodity Price Index

4. What is your expectation with regard to wholesale prices? Where do you think the BLS index — 152.4 as of August 30, 1949 — will stand on December 31, 1949, on June 30, 1950, on December 31, 1950? *Analysis:* The median expectation is an index number of 150 at the end of this year, 148 at the end of next June, and 146.5 at the end of next year. *Conclusion:* A general and moderate downward movement in the wholesale commodity price index is expected between now and the end of next year.

Price Trends

5. Please indicate your opinion as to the wholesale price trend of the following commodity groups during the next fifteen months: farm products, metals and metal products, building materials. *Analysis:* During the next fifteen months, the majority (81.73%) expect wholesale prices of farm products to be downward, with less than 1 per cent expecting an upward price movement, and a moderate number (17.30%) expecting farm-product prices to remain approximately stable.

The expectation with respect to the behavior of the wholesale price index for metals and metal products, and for building is not quite so clear.

The largest number (48.51%) expect wholesale prices of metals and metal products to be downward, but a substantial number (36.63%) anticipate approximately stable prices, and some (14.85%) expect an upward price movement.

So far as building materials are concerned, a clear majority (53.92%) expect wholesale prices to move downward, but a large number (46.07%) do not share this view, more than one third (35.29%) expecting an approximately stable price structure and the remainder (10.78%) anticipating an upward movement. *Conclusion:* Preponderant opinion points to a definite downward movement in the wholesale price of farm products, a downward trend but not pronounced in metals and metal products, and a moderate downward trend in the wholesale prices of building materials as a group.

Cost-of-Living Index

6. What is your expectation with respect to the BLS cost-of-living index — 168.5 as of July 15, 1949 — on December 31, 1949, on June 30, 1950, on December 31, 1950? *Analysis:* A moderate decline in the cost-of-living index is expected between now and the end of next year, generally paralleling the downward movement expectation reflected in the answers to question 4 on wholesale commodity prices. The index of 168.5 as of July 15 this year is expected on the basis of the medians for each date to stand at 167 on December 31 this year, 165 on June 30 next year, and 163 on December 31 next year. *Conclusion:* Generally progressive downward cost-of-living index through next year.

Wages

7. What is your expectation as to wages in general industry during the coming year — hourly rates, benefits equivalent to wage increases? *Analysis:* The predominating number (81.30%) hold that wages in industry will remain generally stable during the coming year, with compelling opinion (92.59%) that workers will receive benefits equivalent to wage increases. Comparatively few (13.08%) expect wages to increase, and fewer still (5.60%) anticipate decreasing wage scales. As to benefits equivalent to wage increases a few (1.85%) expect no increase and a small number (5.55%) expect the picture to remain "generally stable." *Conclusion:* Wages in industry will remain generally stable during the coming year, and the opinion is overwhelming that many industrial workers will receive benefits equivalent to wage increases during next year.

Consumer Expenditures

8. What is your expectation for 1950 with respect to total consumption expenditures? *Analysis:* The statistical weight of answers indicates a decline expectation with respect to total consumption expenditures. Less than one fifth (19.62%) expect an increase, with a substantial number (42.99%) anticipating a decrease, and many (37.38%) expecting expenditures to remain about the same next year. Further emphasis on the downward trend expectation is found in a tabulation of percentage increases and decreases given in the answers of forty-one of the 108 respondents, the median of these indicating a decline of 5 per cent, and the average indicating minus 3 per cent. *Conclusion:* Total consumption expenditures will decline next year, perhaps in the range of 3 to 5 per cent from this year's level.

Residential Building Volume

9. Do you estimate that 1950 residential building volume as measured by new dwelling units will be greater or less than in 1949? *Analysis:* A majority (67.96%) expects fewer dwelling units to be built next year than this, with the median decline based on 90 of 108 answers containing a definite plus or minus figure being 5 per cent, and the average 4 per cent. A sizable number (30.09%) foresee an increase in the number of dwelling units to be built next year. *Conclusion:* Two thirds of the respondents expect the number of dwelling units to be built next year to be less than this year's volume.

Private Nonresidential Construction

10. Do you estimate that the dollar volume of private nonresidential construction in 1950 will be greater or less than in 1949? *Analysis:* Almost three quarters (73.07%) expect a decline in the dollar valuation of private nonresidential construction next year as compared with the volume of 1949, although a large number (25.96%) anticipate an increase. Less than 1 per cent expect little change from this year. *Conclusion:* A downtrend in private nonresidential construction next year.

Public Building and Engineering

11. Do you estimate that the dollar volume of public building and engineering volume in 1950 will be greater or less than in 1949? *Analysis:* A large majority (85.43%) anticipate that the dollar valuation of public building and engineering volume will continue upward next year, a minor number (10.67%) expect a decline, and a few (3.86%) believe volume will be about the same as this year. *Conclusion:* Public building and engineering works next year will exceed this year's dollar volume.

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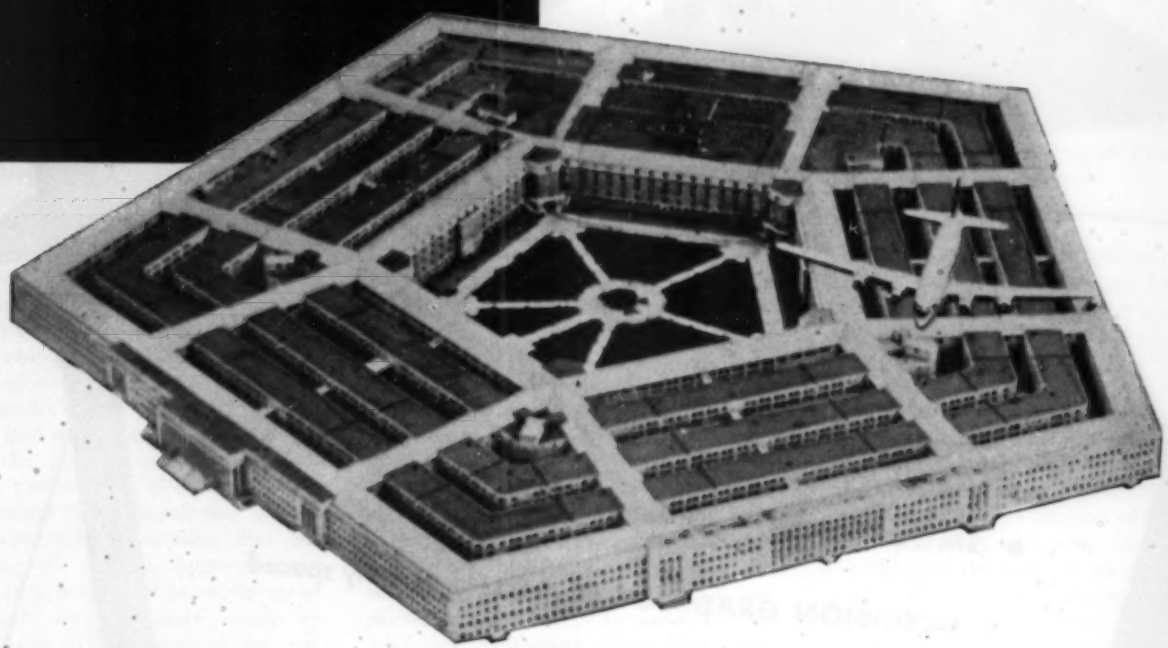

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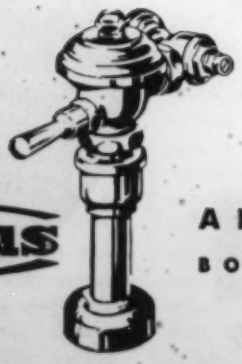

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BRAB Heads Cites Surveys, Research Correlation Conferences as Means of Finding Industry Needs; Legislation for Middle-Income Housing Put Off

• There was a growing trend toward more and more construction research with the passing of the last quarter of 1949. This was true both inside government and out. Overall volume of building dollar-wise continued to promise a relatively high figure for the calendar year; $19 billion was being talked of as a possibility, factors remaining favorable for the balance of the period.

In spite of good volume showing — $14 billion of new construction put in place in the first nine months of 1949 — industry men were determined to discover better, quicker and less expensive methods, new and stronger materials, to uncover market faults and correct them.

The biggest concentration of research effort by private sources will be focused on the Building Research Advisory Board. This is an attempt on the part of all segments of construction to coordinate all research activities. Much of the researching now "at loose ends" in the industry will be catalogued and explained by the agency. Following its second meeting of the year, BRAB is on its feet and going places. Its start has not been spectacular in any sense. Its progress will be slow for some time to come. But it is important that the board now is permanently established and is beginning its work of making valuable research results available to all.

Under guidance of its new director, Dr. William H. Scheick, BRAB is shaping its objectives, laying foundations for a long and beneficial program of telling the industry exactly what is going on in the way of investigation and analysis. Its foremost objective is to define and state research problems of each major segment of the building industry. Dr. Scheick feels that to this end two processes should be started: first, surveys to determine these problems with the active cooperation of associations and technical personnel of industry and other research agencies; second, research correlation conferences on problems of general interest. These conferences, Dr. Scheick believes, should bring together as many interested persons as possible to explore and evaluate each subject, to review research already accomplished, and to recommend a future course.

These are the new director's notions about what the board should undertake as he views broadly its end purposes. He says these ideas may or may not change as the work goes forward. For now, Dr. Scheick has offered the following recommendations as a general guide:

"1. BRAB is concerned not only with the stimulation of research, but also with the acceptance and application of research results. Such acceptance is vital to the goal of end product use which is a major goal of all research. We currently point to the restrictive requirements of lending agencies, codes and labor regulations as insurmountable handicaps to the accomplishments of this goal. However, we overlook a glaring weakness in the research chain, namely the absence of coordinated field tests or demonstrations of research results. I recommend the enlistment of cooperation from the contractors' and builders' organizations to establish machinery for such field tests.

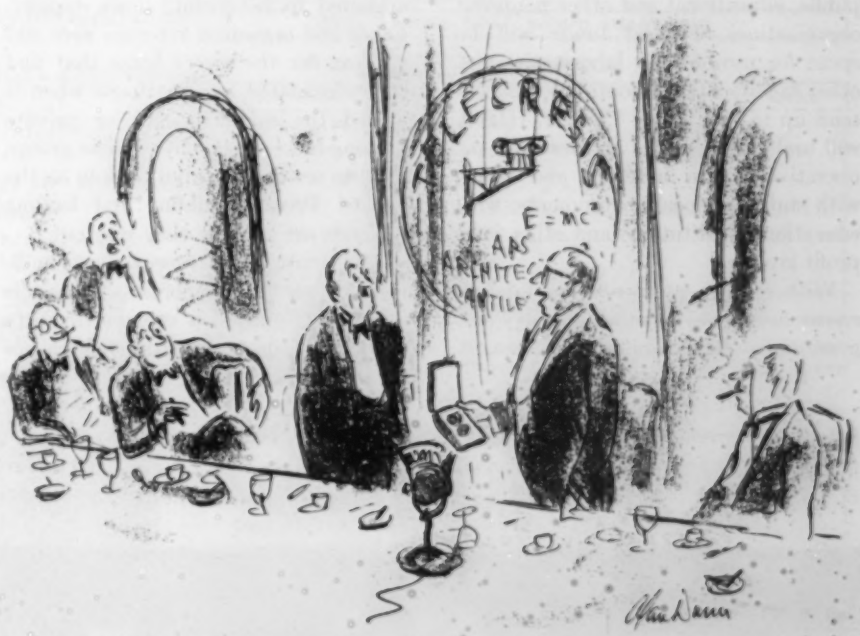
"2. BRAB is interested in all building research. The problems of housing have had the limelight for several years, and not without good reason. It is time to focus equal attention upon other building problems through our surveys and conferences.

"3. BRAB is the servant of all parties interested in research and the government is an important party. I recommend that government agencies concerned with building research be encouraged to avail themselves of the advisory services of BRAB and to participate in our exploratory enterprises. In general, I recommend that the closest possible liaison be established between all research agencies, whether industrial, governmental, educational or independent.

"4. BRAB must function as a clearing house for information and in some respects as an educational agency. For some time there must be continued effort to make its aims and policies more generally understood. I recommend the enlistment of cooperation from professional magazines and others experienced in publication and education to develop a program of education and public relations."

"From these recommendations," added Dr. Scheick, "I believe BRAB can

(*Continued on page 16*)



"And in your lifelong struggle towards the absence of all style you have brilliantly succeeded in establishing a style of your own."

—Drawn for the RECORD by Alan Dunn

THE RECORD REPORTS

(*Continued from page 15*)

develop a program which is broadly significant and at the same time capable of producing worthwhile results."

That is the broad picture of BRAB as it grasps the first rung.

A Single Industry Approach

From Structural Clay Products Institute came the announcement that it had formed a new Industry Research Foundation. This 18-man body will administer a five-year industry-wide program costing $1,250,000. Aim will be to reduce the cost and improve the quality of buildings made of brick and tile. Ermin F. Plumb, Streator, Ill., brickmaker, is foundation chairman. A research director with full responsibility for the foundation activities was to be appointed.

It appears now that a strong tie-in between this private research and the government housing agency is inevitable with Dr. Scheick expressing it as one of his own aims, and with the law specifying that the Housing and Home Finance Agency use private facilities to a great extent in carrying out its research program.

The Housing Act of 1949 authorizes the housing administrator to enter into contracts on a negotiated basis with public, educational and other nonprofit organizations. Federal funds will be spent for use of their laboratories and other facilities. Such contracts may extend up to four years. Further, HHFA will undertake studies and research cooperatively with industry and labor, with state and local governments, with educational institutions and other nonprofit groups.

With respect to correlating existing research, it is obvious that industry and government have similar objectives. It remains only for them to find the common ground in practice. For HHFA intends to serve as a central coordinating point for research that is already being done and to fill in the gaps with projects and studies it undertakes itself. It will make use of existing techniques wherever it can.

The Public Housing Picture

At this writing, the PHA has approved applications for 184,045 units which 102 cities plan to build during the two years just ahead: 93,280 the first year, 90,765 the second. Tentative approval has been given applications for $23,299,300 preliminary planning loans. Considering that there will be many adjustments by localities before construction can be started, that some planned projects may never begin for one reason or another, Mr. Foley stuck by his original estimate that not more than 50,000 units will be constructed during the first 12 months. PHA reduced some of the initial requests before approving them.

New Legislation Lags

As research and low-rent public housing moved ahead as assured programs, the question of government aids to help in housing middle-income families remained as pending business before Congress. The fires that had steamed up so much enthusiasm over these prepared amendments to the housing act appeared to be cooling down rapidly. Labor and organized veterans were still pushing for the direct loans that had been eliminated by the House when it passed the middle-income or private housing bill — H.R. 6070. These groups want to see the loans put back in by the Senate. Private building and lending interests are as eager they stay out.

The House action, however, was nullified by later developments as far as this session of Congress is concerned. Early in October, with both legislative branches pressing for quick adjournment, the whole scheme for new low-cost housing incentives as embodied in the Spence bill and the Sparkman amendments was shunted aside. In its place there was enacted a simple joint resolution (S. J. Res. 134) continuing the present mortgage insurance programs of the government until March 1 of 1950. It took the Senate only five minutes to put through this extension and the House followed its course by arrangement.

This put off til next year the showdown battle on the direct federal loans. At the same time, it postponed decisions regarding increased mortgage ceilings in the FHA program to compensate for high construction costs in certain areas of the country and certain other incentives directed toward lowering housing costs generally.

The decision to put aside the new features of the middle-income bill at this time will have important effects on the mortgage markets. For one thing it gives lenders a firmer ground for operation at least for four months.

The substitution of the joint resolution for the Sparkman amendments in the Senate does not mean that the middle-income housing bill is dead. Quite the opposite was indicated by sentiment expressed on the Senate floor, Sen. Burnet Maybank (D-S.C.) stating he felt housing construction would in no way be delayed by mere extension of the present program.

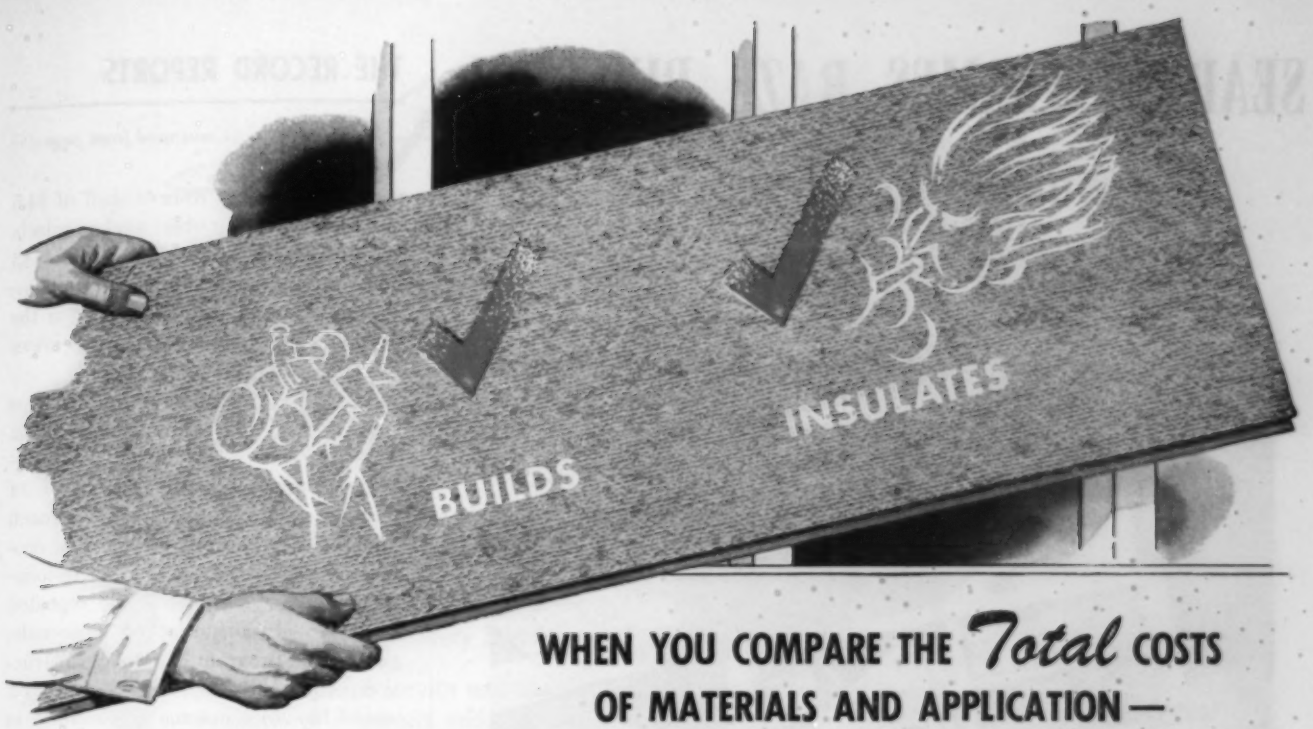
Best opinion now holds that further action on the Sparkman amendments and their alignment with Spence bill as passed by the House will come as an early order of business with the second session of the 81st Congress after Jan. 1.

Public Works Planning

Public works shared the spotlight with housing in Congressional actions. With Senate passage of the new $100 million advance planning bill, it ap-

(*Continued on page 18*)

Recent party given by Thomas S. Holden, president of F. W. Dodge Corporation, was in honor of the RECORD's new editor-in-chief, Harold D. Hauf, and Kenneth K. Stowell, retiring editor (both in photo at left). Center (left to right), guests Philip L. Goodwin, Wallace K. Harrison, Mr. Stowell, Hugh Ferriss, William F. Lamb and Chester Price; right, Mr. Holden, Frank Lloyd Wright and Mr. Hauf



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Refer to Sweet's File, Architectural Section 10a/9

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WOOD SHEATHING Per 1000 Sq. Ft. of Wall Area

ITEM AND QUANTITY	RATE	TOTAL
1,000 sq. ft. 8" wood sheathing (horizontal)		
Waste, 12% (120 sq. ft.)		
Carpenter labor, 15 hours		
Insurance, 10% of carpenter costs		
2.8 rolls building paper		
Carpenter helper to apply paper		
Insurance, 10% of helper costs		
TOTAL APPLIED COST, WOOD SHEATHING		

BILDRITE SHEATHING Per 1000 Sq. Ft. of Wall Area

ITEM AND QUANTITY	RATE	TOTAL
1,000 sq. ft. Bildrite Sheathing		
Waste (Practically none. Less than 1%)		0
Carpenter labor, 8 hours		
Insurance, 10% of carpenter costs		
Building paper (None needed)		0
Helper to apply paper (None)		0
Insurance on helper (None)		0
TOTAL APPLIED COST, BILDRITE SHEATHING		

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WRIGHT RUBBER TILE

FLOORS OF DISTINCTION

THE RECORD REPORTS

(*Continued from page 16*)

peared the present reserve shelf of $4.5 billion in planned public works projects might soon be increased by some $3 billion. Such an addition might "place us within the margin of safety" in the words of Jess Larson, General Services Administrator.

Now that the advance interest-free loans for planning non-federal public works projects were about to be restored, Larson called for a change of thinking on this subject. The approach should not be geared to changing economic conditions, he urged, but to long-time public works needs. He repeated earlier suggestions that no large-scale, nationwide program of public construction is needed now. However, Larson would like to see some acceleration in areas where building trades workers are unemployed. Loans for plan preparation would put GSA in a better position to aid these areas, he contends.

Loans for Lustron

The Reconstruction Finance Corporation has a $37.5 million stake in the fortunes of Lustron Corporation, manufacturer of prefabricated houses at Columbus, O., but it can't decide whether to sink another $12 million or so in the venture. It has asked for guidance from Congress and by the end of the year will have two engineer survey reports to back its decisions.

Though RFC has pumped the federal loan reservoir nearly dry, best estimates place at $12.5 million the additional amount needed to put Lustron on a paying basis. Presently, the firm is said to be going into the red at a rate of $1.5 million a month. It has produced something less than 2000 of its enamel-covered steel units so far. Opening a month ago after a brief shutdown for inventory, Lustron began production of three-bedroom houses for the first time.

Shorts

• The nation's housing expediter, Tighe Woods, is going ahead with his experiment in low-cost housing construction, having secured VA guarantee of mortgages. He is building a dozen more in the Virginia woods near Washington. Price settled upon for the one-bedroom unit with lot is $6450. Contract closing charges are $125 and monthly payments are $42.50, $2.50 of it for water service. No down payments are required. Woods

(*Continued on page 20*)

Announcing

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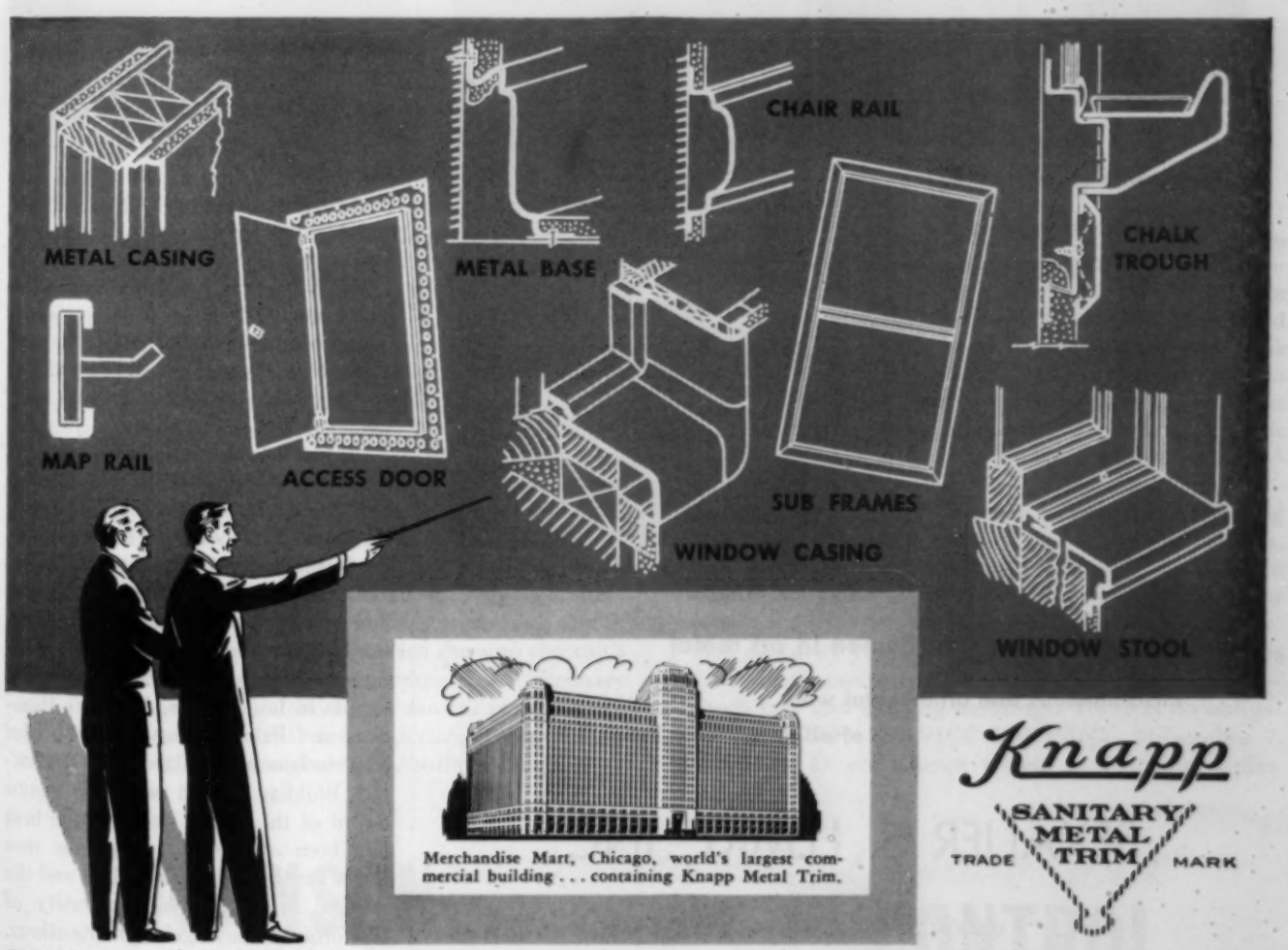

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VERNON BOULEVARD AT 35TH AVE.

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THE RECORD REPORTS

(*Continued from page 18*)

says he has "100 per cent financing" on the one-story house. Mortgages bear four per cent interest, run for 25 years. All sales now are being made to Army personnel.

• Dr. John R. Steelman, presidential assistant, reported that the plan to channel federal construction and procurement into depressed areas suffering heavy unemployment was showing results. The General Accounting Office approved as general policy the award of contracts to firms situated in any distressed area in event of equal low bids.

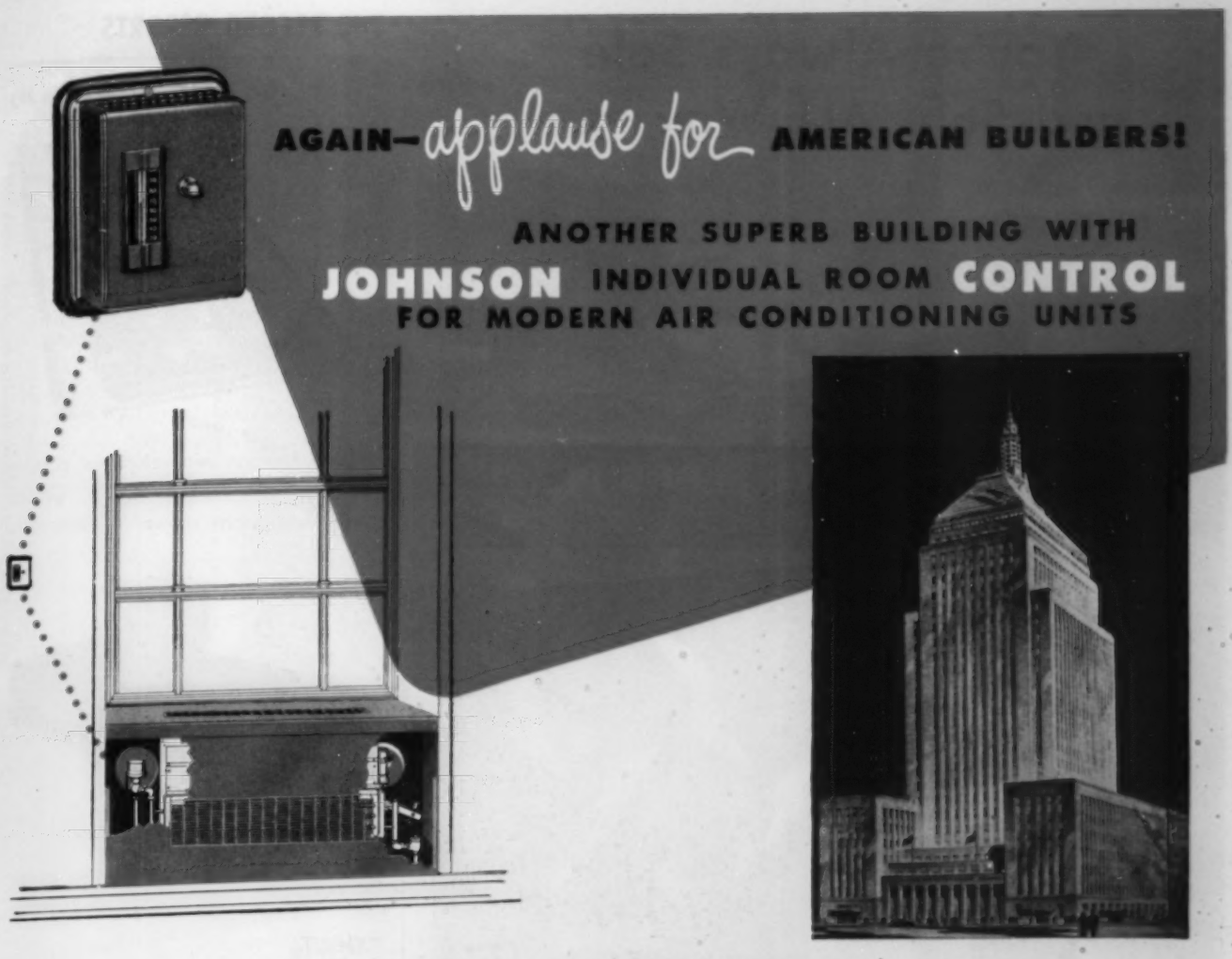
WALTER WURDEMAN

Walter Wurdeman, Architect, and partner in the firm of Wurdeman and Becket, died September 17 of a heart attack while in his doctor's office in Los Angeles. He was 46.

Mr. Wurdeman was a graduate of the University of Washington and received a master's degree at the Massachusetts Institute of Technology. He studied also at the École des Beaux Arts at Fontainebleu, France.

His death was the culmination of a serious heart condition which had forced him to take only a semi-active part in the firm which bears his name, one of the largest architectural concerns in the West. Until his illness, Mr. Wurdeman had collaborated with his partner, Welton Becket, on many well-known buildings, including the Pan-Pacific Auditorium in Los Angeles, Bullock's Pasadena and Palm Springs stores, the Jai Alai stadium in Manila and the Prudential Building, which won the honor award of the A.I.A. Recently the firm had been engaged to design the new Lever Brothers processing plant and the medical center for the University of California at Los Angeles, among others.

(*News continued on page 22*)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ANOTHER SUPERB BUILDING WITH
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Here's another building that is swelling the pride of America! The new building of the John Hancock Mutual Life Insurance Company incorporates many modern features which facilitate working efficiency and add new comforts. All of the drudgery and watchfulness, so necessary in olden days to insure temperature comfort, is turned over to Johnson Automatic Control systems in our modern buildings. These super-human "automatic brains" are on duty 24 hours of the day to insure that exactly the required results are obtained from the air conditioning units.

In the John Hancock Building, the supply of conditioned outdoor air is handled separately by central "primary air" systems. It is cooled, dehumidified to proper relative humidity and introduced into each room through a unit, mixed with recirculated air and passed through the unit's coil, which heats it to the correct temperature. "Primary air" is furnished to the units by 17 central plants where Johnson "Master Control" assures a constant dew-point temperature of 55° throughout the cooling season.

A Johnson Thermostat, measuring the temperature in each conditioned room, assures precisely the desired temperature by controlling the Johnson Valve on the coil in the unit (thus adding the necessary amount of heat) and by varying the quantity of cool, primary air, under the command of a Johnson Piston Damper Operator. When no heat is required, the valve closes, and the damper admits cool primary air as needed. There are 1,250 air conditioning units in the John Hancock Building and 775 Johnson *Dual* Thermostats.

Johnson *Dual* Thermostats are fuel savers . . . effecting economy by supplying comfort heat to occupied rooms, while maintaining a reduced temperature in areas not in use, without the necessity of separate steam or hot water mains.

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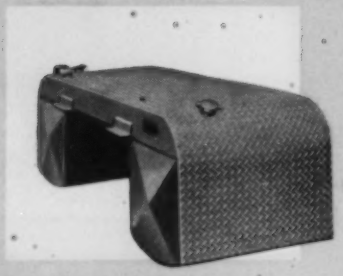

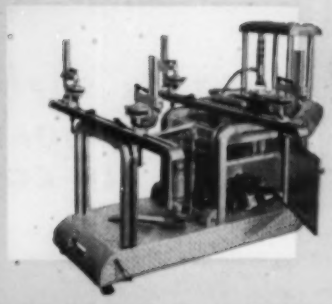

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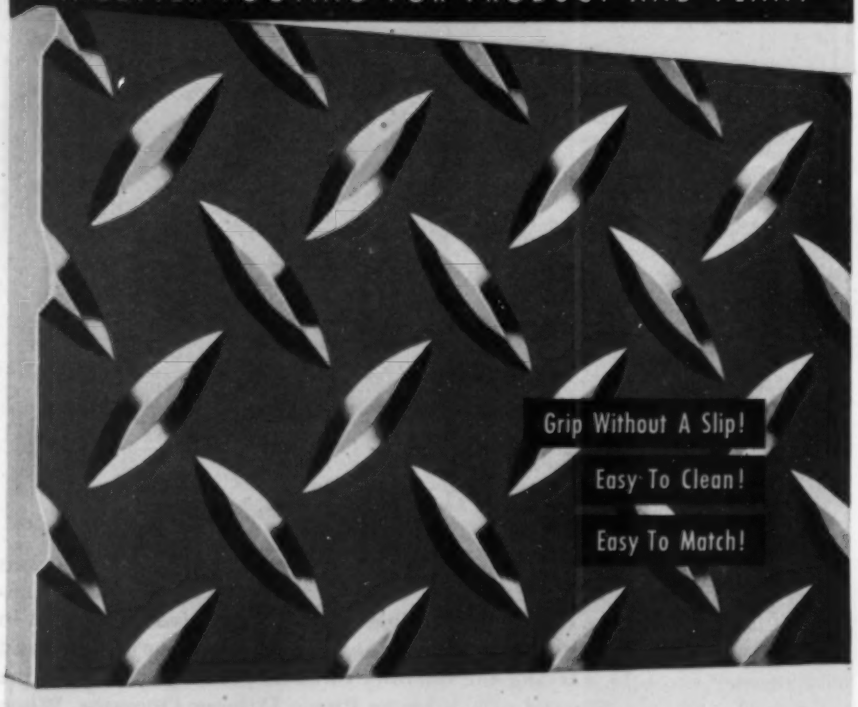

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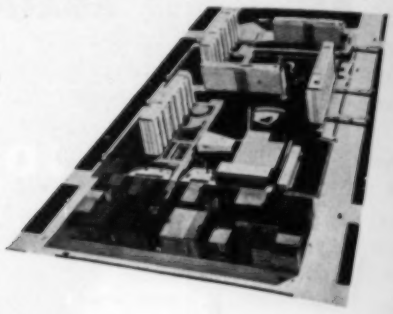
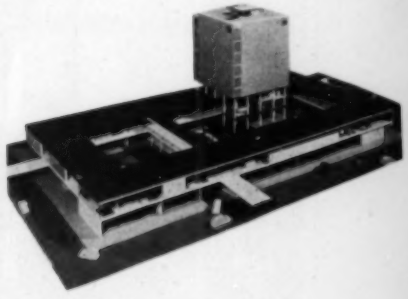
THE RECORD REPORTS

(*News continued from page 20*)



Model of urban redevelopment scheme for New York City by Olindo Grossi. Current conditions shown in foreground



Model of two-story shopping center

EXHIBIT

An introduction to community planning will be given students of 54 New York City high schools with the circulation of an exhibit designed and executed by Olindo Grossi, chairman of the department of architecture at Pratt Institute. The exhibit consists of four models depicting ideal conditions for living in the city and country, working in office or factory and for shopping centers.

Sponsored by the New York Chapter, A.I.A., in conjunction with the Board of Education of New York, the exhibit was originated to acquaint students with the good features of, and the need for civic planning. Funds for the exhibit came from the Arnold W. Brunner Scholarship awarded Mr. Grossi. R. D'Agrosa and R. Corbelletti, students at Pratt, aided in the design and the theses of R. Bentel and H. Horowitz were adapted for the urban redevelopment study.

AWARD WINNERS

Direct Mail Awards

The Flintkote Company and the Celotex Corporation have received tie awards of "Best of Industry" for their

(*Continued on page 24*)

Now! a New Design Freedom for Architects

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Schlage Pantheon Design
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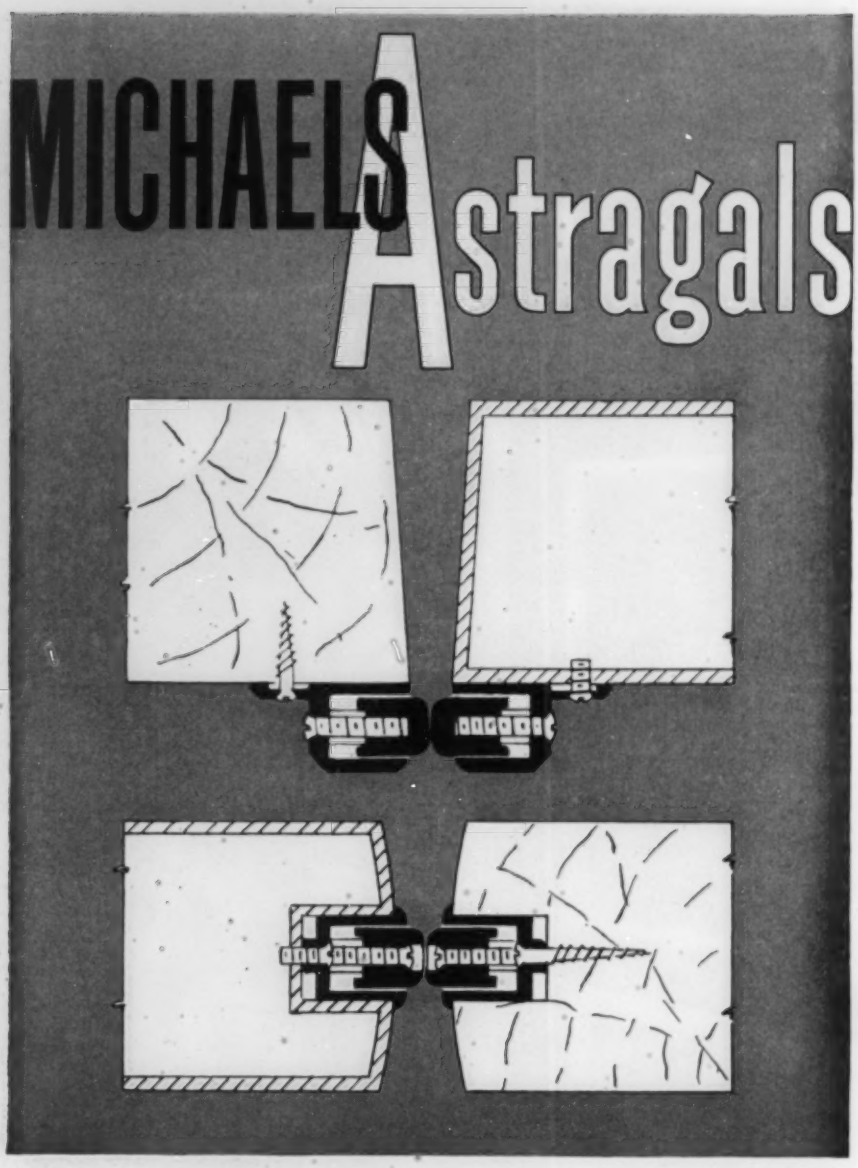
MICHAELS Astragals



Write today for information and prices on Michaels Adjustable Astragals. Made of extruded bronze, aluminum or nickel, they are simple, practical, rugged, easily installed and adjusted, and available in several styles. Two are shown above. Type A (top illustration) may be applied to either wood or hollow metal bevel doors. Also used as a stop bead. Type E (lower illustration) is for bullnose hollow metal or wood double doors. Both types may be used at the bottom of doors. Michaels Astragals help keep doors closed tightly . . . eliminate drafts and air currents . . . keep out dirt and dust. Write for details. Astragals are only one of many items in the Michaels line. So whatever building product you need, if it's made of metal, we may have it or can make it.

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Wrought and Cast Radiator Grilles
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Member of the National Association of Ornamental Nonferrous Metals Manufacturers

THE RECORD REPORTS

(*Continued from page 22*)

1949 direct mail and sales promotional campaigns from the Direct Mail Advertising Association. Ivel Corporation, exhibit builders, of Corona, New York City, have been awarded a "Best of Industry" certificate for their exhibit direct mail campaign. Top honors were also taken by the Janitrol Division of Surface Combustion Corporation for its entry in the competition.

Producers Council Award

Writers of the three best research papers in the course, materials and methods, at Western Reserve University's School of Architecture have received the Producers Council awards. They are Alexander Oley, Jr., first prize; Robert Earl Warner, second prize, and Robert Pinguey Story and Donald Spaulding Woodard each received third prize. Purpose of the competition is to acquaint students with the activities of the Producers Council and its association with the A.I.A.

Lighting Honor

Dr. Ward Harrison, who retired in 1948 as director of engineering for General Electric Company at Nela Park, Cleveland, has received the most-prized award in the lighting field, the I.E.S. Medal, at the opening session of the 1949 National Technical Conference of the Illuminating Engineering Society.

Concrete Prize

The firm of Ammann & Whitney, consulting engineers, of New York, have been given the first in a series of $500 Annual Awards sponsored by the Concrete Reinforcing Steel Institute. The work upon which the award was based was the firm's 30 years of research on concrete arch bridges, on thin-shell arch buildings and on plastic theories of concrete design by Mr. C. S. Whitney and the application of this research to recent designs by the firm.

Bridge Design Winners

Awards totalling $6250 have been presented to bridge designers in the results of the Lincoln Arc Foundation's award program, "Welded Bridges of the Future." Design requirements specified plans for a two-lane, 120 ft. deck highway bridge of all welded construction and utilizing where necessary the designer's ideas for new steel shapes which

(*Continued on page 26*)

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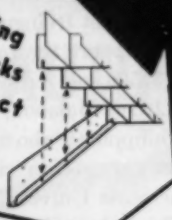

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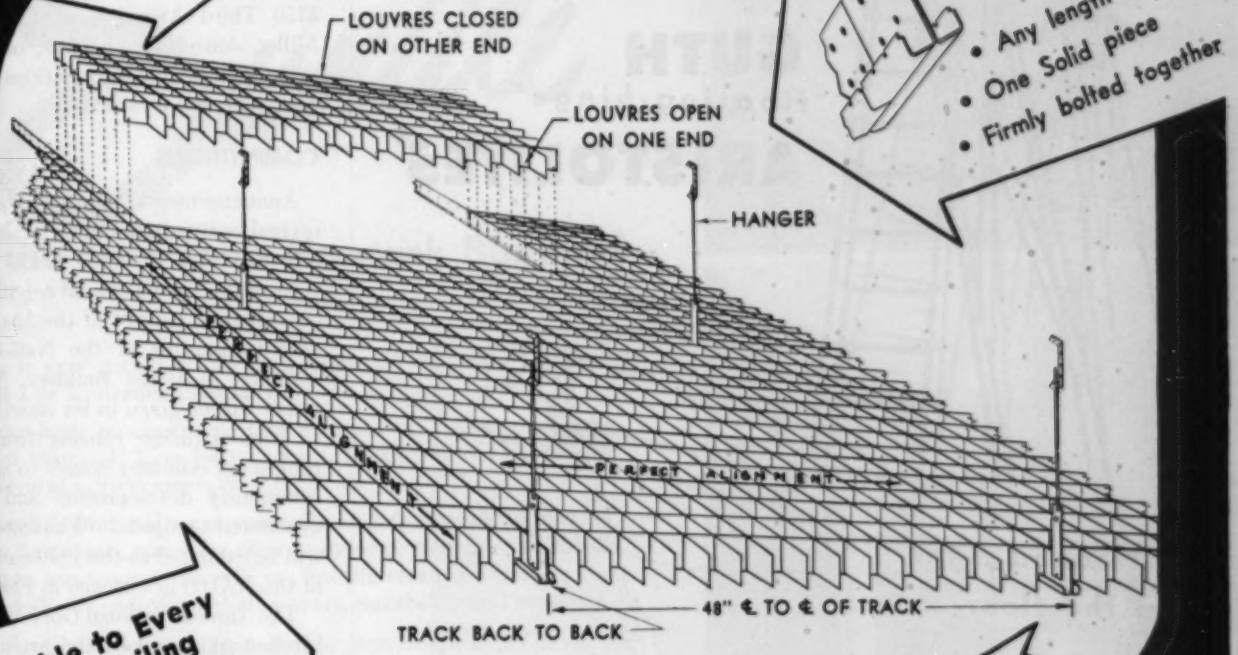

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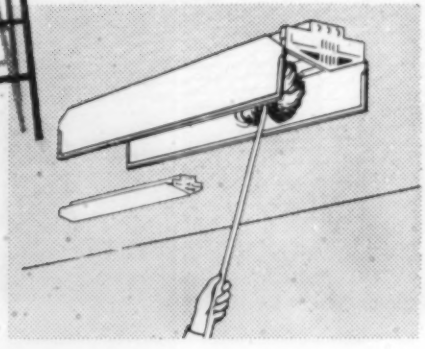

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876

THE RECORD REPORTS

(*Continued from page 24*)

could readily be produced for the more efficient use of steel. The $3000 First Award went to Thomas C. Kavanagh, professor of civil engineering at Pennsylvania State College. His design employs a compact triangular shaped steel frame to support the roadway. Second prize of $1500 was received by Angel R. Lazaro, Jr., of Malabon, Rizal, Republic of the Philippines, who has just received a master's degree in civil engineering from the State University of Iowa. The $750 Third Award went to Fred C. Miller, consulting engineer, of Toledo, Ohio. Ten honorable mentions of $100 each were also awarded.

COMPETITIONS

Announcements have been made of several competitions open to architects and members of allied fields. Among them is the second annual neighborhood development contest of the Land Planning Committee of the National Association of Home Builders. National prizes will be given in six classifications of home building ranging from small projects of economy houses to complete community developments and garden apartment projects. Winning entries will be exhibited at the 1950 convention of the NAHB in Chicago in February.

The Annual National Gold Medal Exhibition sponsored by the Architectural League of New York regularly until 1938, but suspended for the past decade, is being revived this year on the initiative of Chester B. Price, new president of the League. Architects, artists and designers have been invited to submit work done since 1938 for a preliminary series of monthly shows beginning the fourth week of November at League headquarters, 115 E. 40th St., New York 16, N. Y. A distinguished jury will choose exhibits for the 53rd Annual Gold Medal Exhibition, scheduled May 15 to June 9 at League headquarters. At this show Gold Medals will be conferred on winning exhibits.

The American Institute of Decorators has announced conditions of its 1949 Design Competition in fabric, furniture, floor covering, wall covering and lighting fields. Companies, designers and students are urged to submit designs before the closing date of January 2nd, 1950. Citations of Merit will be awarded the winning designs.

(*Continued on page 28*)

BEAUTIFUL, DURABLE Suntile in the new John Hancock Building

Boston is very proud of the new home of the John Hancock Mutual Life Insurance Company.

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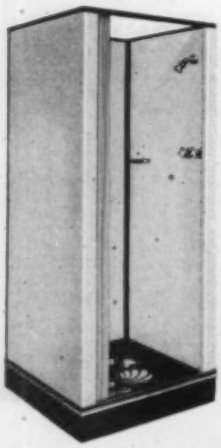

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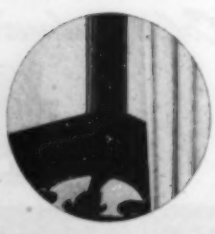

HENRY WEIS MFG. CO., INC., 1103 Weisway Building, Elkhart, Indiana

THE RECORD REPORTS

(*Continued from page 26*)

The James F. Lincoln Arc Welding Foundation, of Cleveland, Ohio, has announced its third annual competition in the Engineering Undergraduate Award and Scholarship Program. The program offers annually $6750 in awards and scholarships to engineering students and schools for the best papers by undergraduates on arc welded design, research, fabrication or maintenance. A total of 77 awards ranging from $1000 to $25 will be presented to students and $1750 for 7 scholarships to schools.

Toddletown, children's shop in the Bronx, N. Y. By Gerald Anthony Paul, Architect

WITH THE A.I.A.

Plan 1950 Convention

From the Octagon comes word that the Washington-Metropolitan Chapter has a good head start on plans as host chapter for the 1950 convention, May 10–13. Headquarters will probably be the Mayflower Hotel. Also scheduled to meet in Washington at that time are the City Planning Conference, American Institute of Planners and representatives of the Joint Committee on the National Capital.

Additional Brunner Scholarship

A supplementary Arnold W. Brunner Scholarship for 1949 has been awarded by the New York Chapter, A.I.A., to one of its own committees, the committee on housing. The additional scholarship is being offered to enable the committee, headed by Arthur C. Holden, to publish its report of a two-year study and appraisal of technical accomplishments of the New York City Housing Authority. Established in 1940 and offered for advanced study in architecture, the award has heretofore been made to individuals only. The additional funds are now available as there was no award made in 1945

(*Continued on page 160*)

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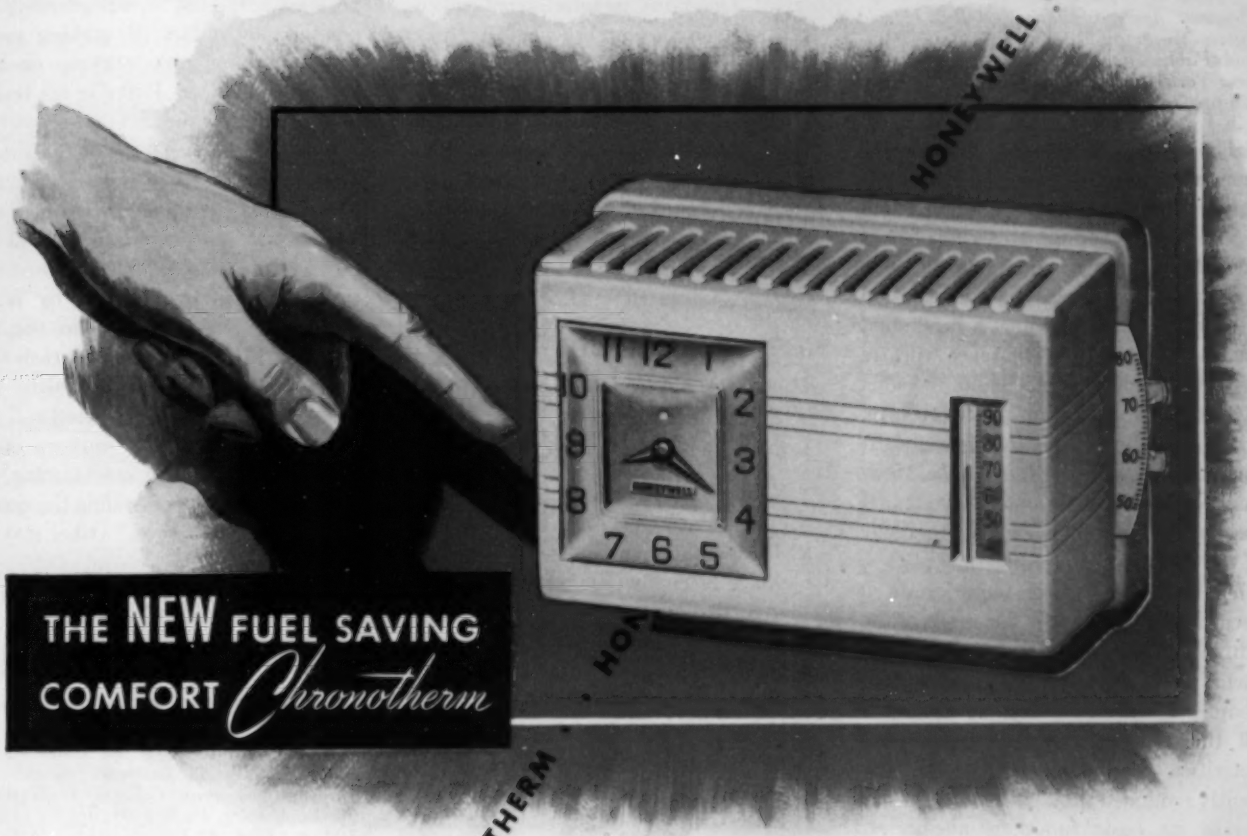

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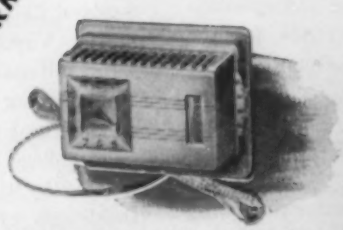

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REQUIRED READING

PLANNING FOR ENTERTAINMENT

Theatres and Auditoriums. By Harold Burris-Meyer and Edward C. Cole. Reinhold Publishing Corp. (330 W. 42nd St., New York 18, N. Y.), 1949. 11½ by 8¾ in. 228 pp., illus. $8.00.

The authors of this book have spent more than ten years in making an exhaustive study of theatre function and reducing their findings to terms of time and physical dimension. The result is a large package of essential information that will give the architect a head start on the solution of whatever theatre problem he may have at hand.

The out-front section of the theatre, with its traffic, seating, acoustics, sight lines, etc., is discussed from the viewpoint of the audience, while layout and mechanical equipment on the other side of the footlights are treated only as they affect the successful presentation of a theatrical performance. The needs of the administrative and business departments form another unit, and a final chapter discusses the interdependence of all the various theatre elements and activities. Here the architect is prudently reminded that "the theatre which fulfills its basic functions adequately will titillate the sensibilities of the dilettante and make money for the impresario."

Every type of theatre is discussed, those for motion pictures as well as legitimate productions; amateur as well as professional; and the special problems of each are analyzed as they affect both client and architect. Needs of varying groups are discussed, from high schools to the theatre owner who runs "a boarding house for shows." Special attention is given to theatres which must serve a variety of purposes. Auditoriums are included as a theatre type, since "purely auditorium function will seldom pay for or support a building." In addition to this study of types of buildings, a four-page chart explores the various types of performances — their subject matter, visual components, auditory components, routine, and audience.

There is a close correlation of text, illustrations, and tables. Flow charts trace the movements of audience, actors, and stagehands, while tables list steps and procedures in various phases of theatre work, and give areas for a variety of facilities and their arrangement. Diagrams include sound reflection, reverberation, scenery set-ups, stage machinery, lighting, speaker systems, and control layouts.

This stimulating volume amply fulfills the authors' statement of purpose: "We have endeavored to set forth . . . methods . . . and essential considerations, to the end that no important aspect of planning any element of the theatre shall be slighted."

INFINITE RICHES, ETC.

How to Beautify and Improve Your Home Grounds. By Henry B. Aul. Sheridan House (257 Fourth Avenue, New York 10, N. Y.), 1949. 5½ by 8¼ in. 316 pp., illus. $3.50.

Henry B. Aul is assistant horticultural editor of the *New York Herald Tribune*, and a practical man. His gardens are planned more for use and enjoyment than for display, and his book is centered around actual garden plans rather than landscape theory.

Owners of average backyards will be pleased to discover that amenities may come in small packages, and that with clever planning a lot as small as 40 by 80 ft. can accommodate not only the usual house, clothesline and flower bed, but a terrace, a vegetable patch, a simple pool, and a garden shelter as well. Even for a boxed-in city yard, Mr. Aul has plans for leisurely lounging amid potted plants and vines. He also treats such familiar problems as detached garages, sloping sites, wooded properties, and screening corner lots from the street.

Often outdoor living is provided at the expense of so-called "service areas," which are inclined to be microscopic and too far removed from the house, but in general this is a book which will stimulate the imagination and ambition of the suburbanite, and one for the small-house architect to recommend to his clients.

HEALTH IN INDUSTRY

Industrial Hygiene and Toxicology. Edited by Frank A. Patty. Interscience Publishers, Inc. (215 Fourth Ave., New York 3, N. Y.), 1948 and 1949. 9¾ by 6½ in. Vol. I, xxviii + 532 pp.; $10.00. Vol. II, xxviii + 1138 pp. $15.00.

"The object of this book is to present industrial hygiene and toxicology in simple, understandable terms in sufficient detail to be of some use to all persons interested in safeguarding the health and welfare of working people and improving the working environment," writes Mr. Patty in his preface to this lengthy work.

Most of the book treats the subject from a medical or chemical point of view, but the architect or engineer concerned with industrial building will find a good deal of applicable material, particularly in the chapters by W. N. Witheridge which appear in the first volume. These chapters, entitled "Environmental Factors in Fatigue and Competence" and "Ventilation," discuss light, sound, and sanitary conditioning, as well as air conditioning, and the "problems of controlling the quality of indoor atmospheres." Other material of interest includes control of dust and combustible gases, and the "engineering methods of control" of many of the health and safety problems presented.

WILLIAMSBURG AGAIN

Colonial Williamsburg: Its Buildings and Gardens. By A. Lawrence Kocher and Howard Dearstyne. Colonial Williamsburg (Williamsburg, Va.), 1949. 9½ by 11¾ in. 104 pp., illus. $2.75.

Any tourist planning a visit to Williamsburg will find a helpful briefing in this newest treatment of the Rockefeller restoration, and before he puts the book down even the casual reader — architect as well as layman — may find himself considering the possibility of such a trip.

Following the Williamsburg motto "That the future may learn from the past," the authors have reconstructed the story of an American town that was successfully planned and built for the needs of its people. Eighteenth century life in Virginia centered around the great self-maintained plantations, and Williamsburg is described as the political and cultural capital of the colony — a quiet college town enlivened at certain seasons by the fairs, races, balls, and theatricals which the planters came to attend while courts and legislature were in session. Several chapters show how houses, gardens, and public buildings were constructed and furnished to provide a gracious and practical setting

(*Continued on page 34*)

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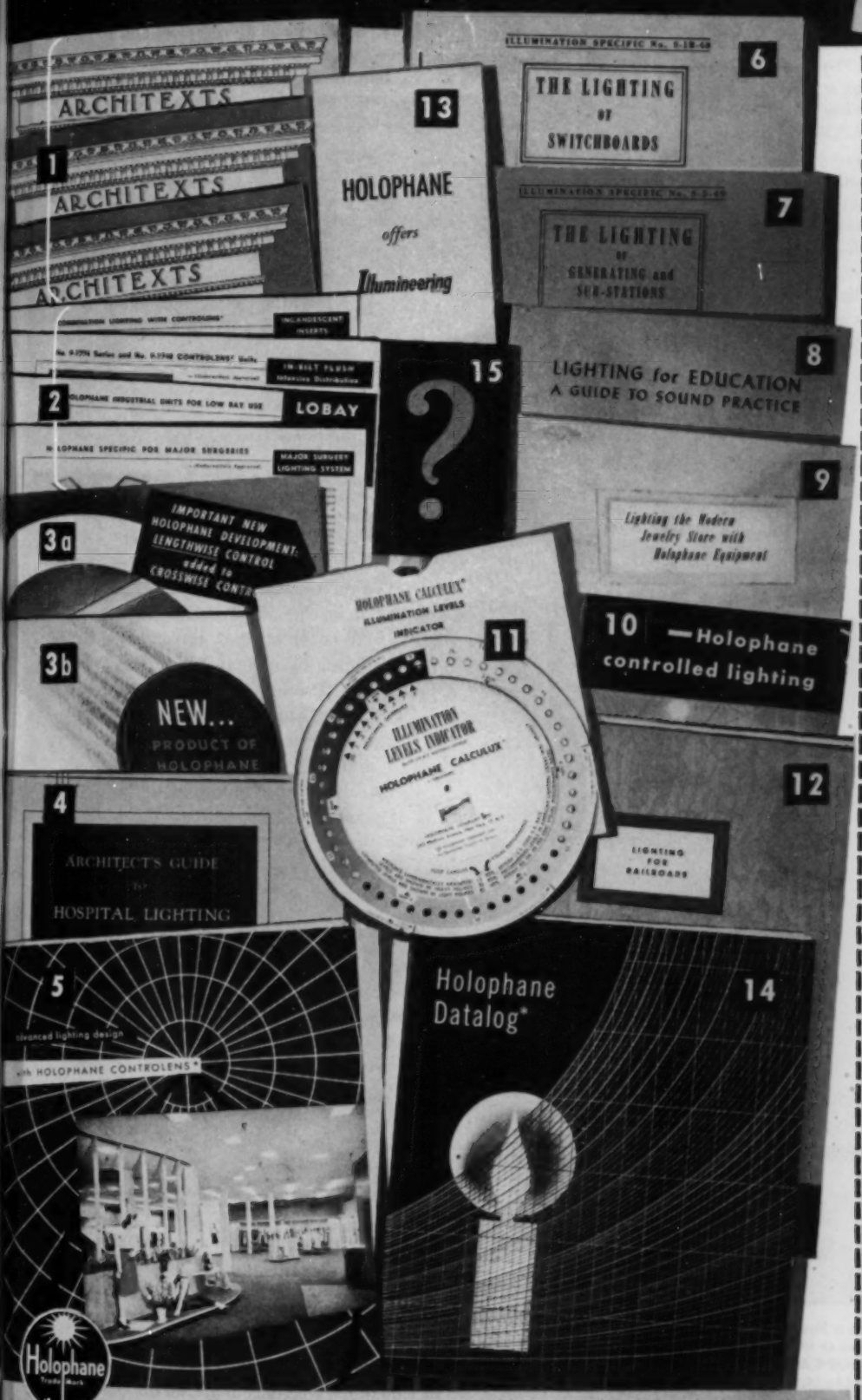

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SEE OUR CATALOG IN SWEET'S

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REQUIRED READING

(*Continued from page 32*)

for study, lawmaking, and amusement.

Another section will answer in gratifying detail the visitor's questions as to the way the restoration was carried out, explaining as it does the painstaking research, site excavation, and preservation of surviving parts that went on before any rebuilding was attempted. Of particular interest here is a page on which pictures of restored buildings are placed side by side with "before" photographs and the faded old sketches from which the restoration architects worked.

The photographs in the second half of the book are arranged to serve "as a helpful accompaniment to a walking tour, and as an accurate record of what has been seen in Williamsburg."

BUILDINGS IN DENMARK

Contemporary Danish Architecture. By Esbjorn Hiort. Distributed in U.S.A. by the Scandinavian Book Service (Box 99, Audubon Station, New York 32, N. Y.), 1949. 6½ by 7¾ in. 108 pp., illus. $2.95.

A wide variety of building types is covered in this small volume, which is intended to serve as an introduction to the subject of modern architecture in Denmark. Printed in parallel columns of Danish and English, it is directed both to Danes and to foreigners as an aid to the understanding of the country's culture and social conditions.

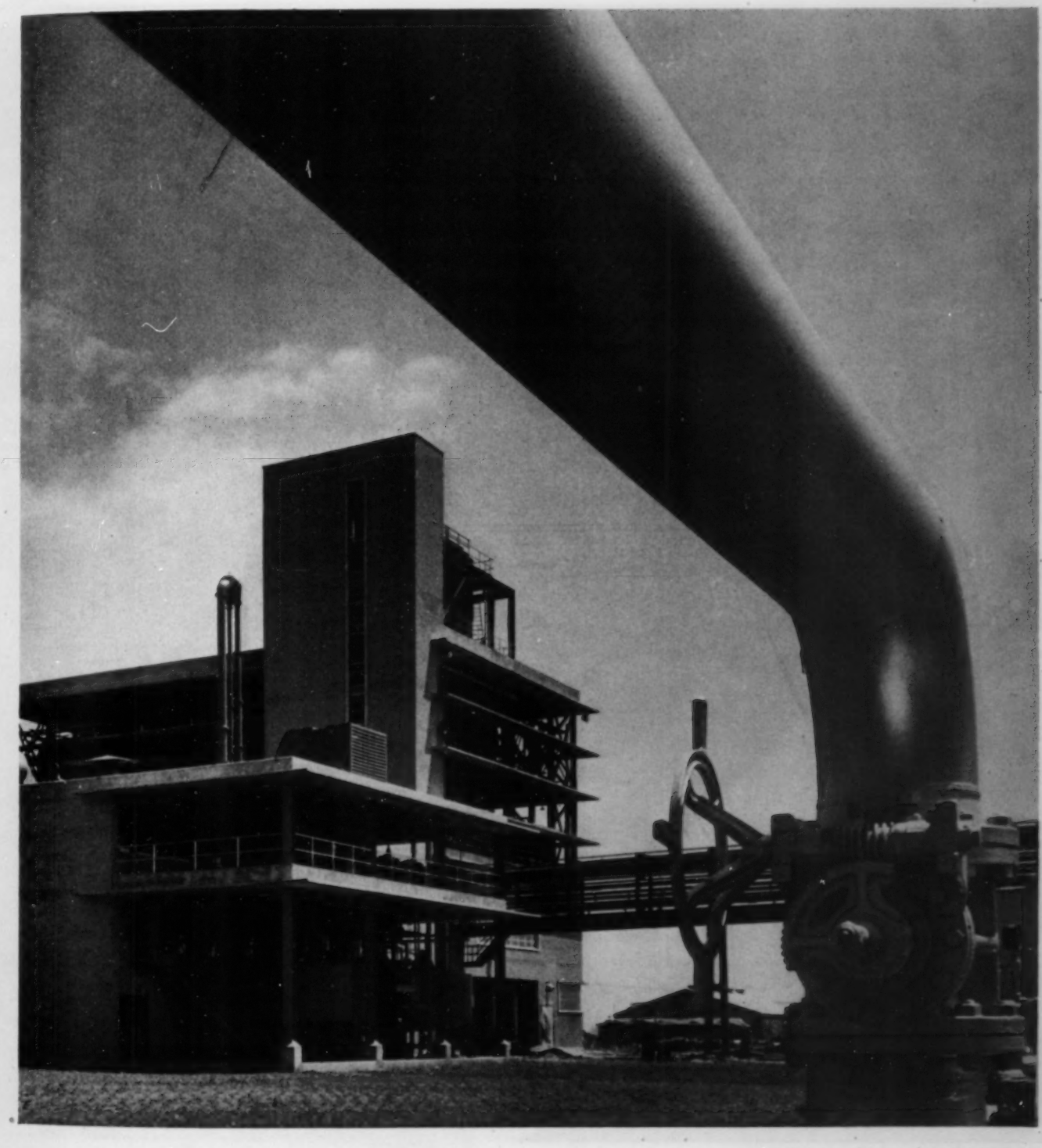
The author discusses first the buildings of the past 15 years which have followed the national brick tradition, and then a group built in modern ferro-concrete. It is pointed out that international influence is not new to Denmark, (which has always been subjected because of its position to European ideas), but that the Danes have always refined such ideas for their own use. It would seem from examination of the two groups of brick and concrete buildings, that the most successful modern Danish architecture is that which has done the most national refining.

In addition to the representative churches, schools, libraries, and public buildings, the book discusses single- and multi-family dwellings, with a review of the history of Danish housing problems which closely parallels similar developments in America.

Some pages of biographical notes provide quick reference material on Danish architects and their works.

INDUSTRIAL BUILDINGS

ARCHITECTURAL RECORD'S BUILDING TYPES STUDY NUMBER 155



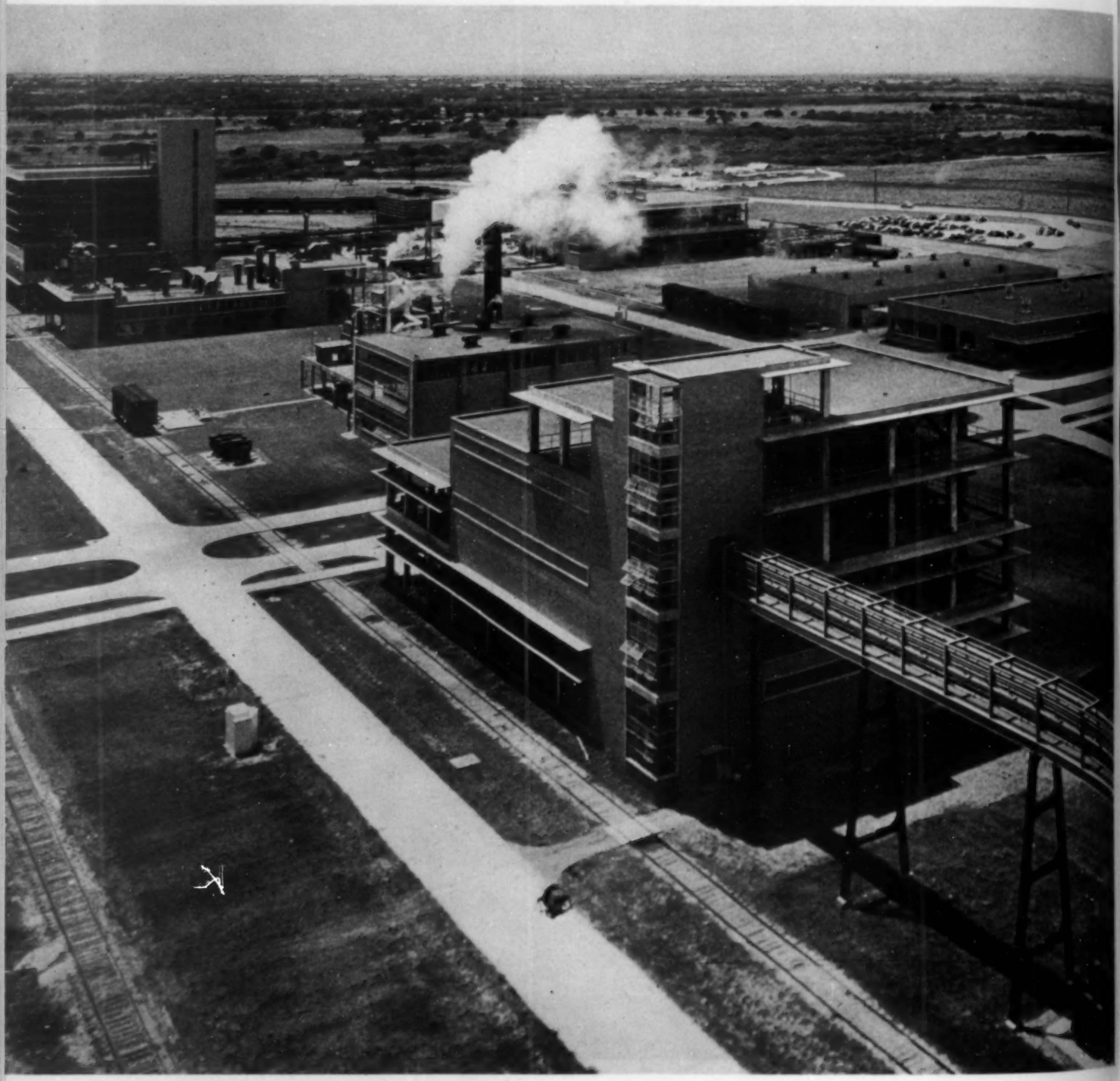
Elwood M. Payne Photo

Is it a building, or a machine? Whatever you call it, it is design of a high order, realizing to a degree seldom attained the beauty achieved only by close integration of engineering and architecture. Bluebonnet Plant, Corpus Christi, Texas, for Corn Products Refining Company: The H. K. Ferguson Company, Industrial Engineers and Builders

ARCHITECTURE MEETS MACHINERY

The H. K. Ferguson Company, Industrial Engineers and Builders;

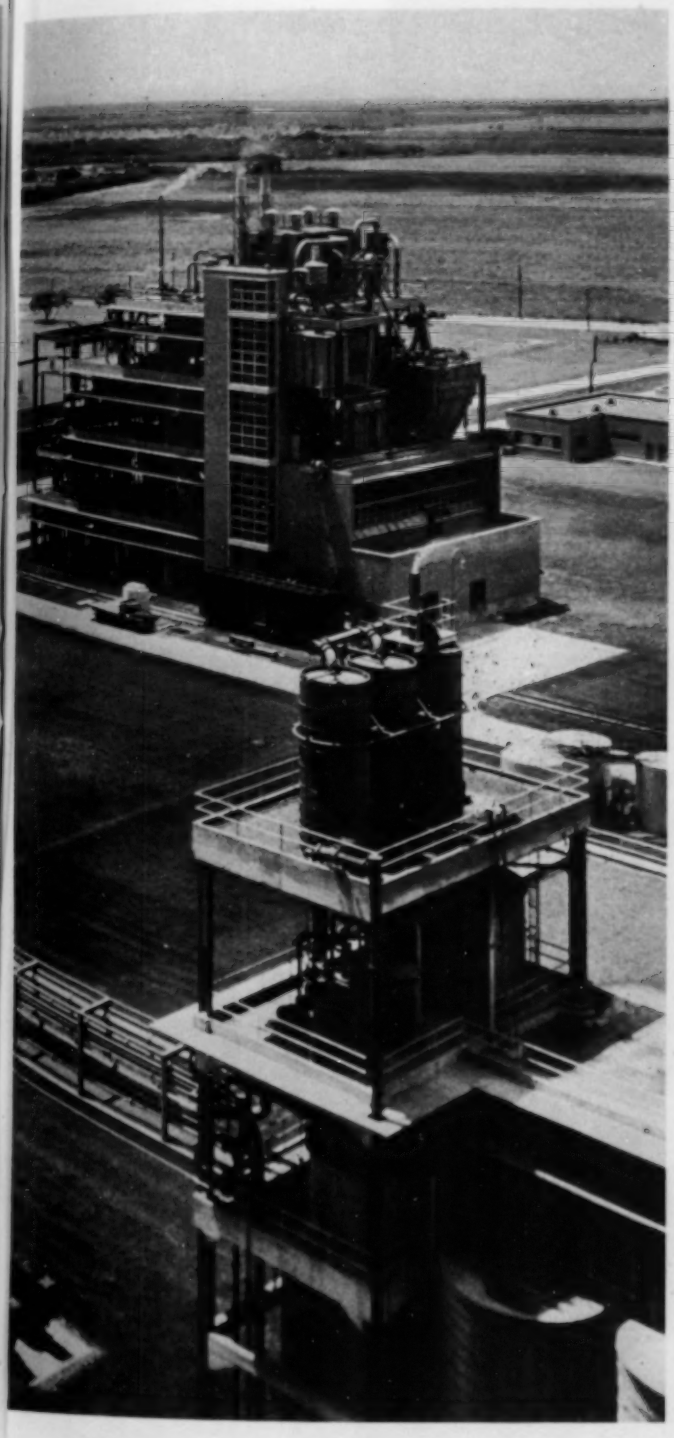
Elwood M. Payne Photo



Bluebonnet Plant, Corn Products Refining Company, Corpus Christi, Texas

AND LIKES IT

Frank L. Whitney, Project Architect



Process engineering in collaboration with the engineering staff of Corn Products Refining Co.

IF it seems strange that one of the most stimulating architectural designs of recent years is found in an industrial plant, logic soon dispels any surprise. In no other area of building, actually, does modern organic design find such natural compatibility between visual expression and basic engineering. Here are indeed some dynamic elements of visual excitement: the wonder of American science, the thrill of mass and space, the marvels of an intricate variety of machines. Put these together with sufficient imagination, and the nerve to follow logic into uncharted paths, and the possibilities begin to mount up.

What is more surprising in this instance is the vast distance these "buildings" have gone forward from their conventional starting line. The point of departure was an old type of mill building, full of anachronisms and handicaps. The point of arrival, seen in these photographs, could hardly be called "buildings" at all. They look more like machines, and that's what they are.

So here is a plant which represents not only the true theory of modern architectural design, but also in a sense its epitome. Here is architecture leading engineering to its logical beauty of form. And thus realizing its own aims to a degree not often attained.

It is fitting to point out that there was nothing accidental about this realization. One of the early requests of the client — in the person of vice-president J. L. Buckner — was that the plant should be visually stimulating. No need to worry about the engineering — both the Ferguson and Corn Products staffs had plenty of process specialists. But the integration of all of the parts was a task for an architect.

The design, it was felt, should be considered an integration of process design and architecture. Architecture could lead or it might actually retard a logical process layout. Many existing process plans have been compromised by architectural precedence. Although it is not always apparent, architecture plays a very dominant role in the basic planning of a plant. Almost at the outset of the design development, the influence of the housing facility asserts itself. Thus it follows that not only for esthetic considerations, but also for the development of a logical process plan, the real contribution of the industrial architect is made at the beginning. Once a fresh start is made, with logic instead of precedent as the guide, the engineering as well as the architecture becomes more free, more dynamic.

In this case the windows were the first point of attack; precedent literally went out the window. In the steep house, acid fumes used to eat out window sash; it even ate out the settings of glass block, not to mention its effect on workers' comfort. So why not leave out windows entirely, and let in some Texas fresh air? And, having digested this, why stop there? Why not

figure out exactly how much protection is required, and just build that?

This line of reasoning soon led to similar questions about all buildings and machines, until it became standard practice to inquire if there wasn't some possibility of leaving things exposed. Some must be enclosed — stair towers, instrument panels and controls, packing rooms, and the like. Some must be enclosed at one point, could be left exposed at another — motors, filters and various others.

Torrential rains and the hot sun of Corpus Christi frequently called for roofs and sunshades to cover both machinery and men, but the breeze from the bay could well be used to blow fumes from the steep house and dust from the grain conveyors, automatically doing the housecleaning and removing an explosion hazard.

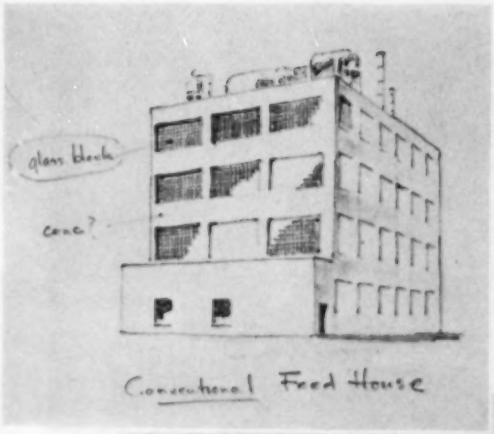
The architect, asked to be quite frank about how much "tampering" was done with process layouts in the interests of clean design, answered that the questioning of process drawings was in fact continuous, and that frequently equipment manufacturers were asked to clean up their designs. He pointed out, however, that the continual refinement was also a search for economies. Mostly it was a process of integrating designs of separate specialists. He pointed out that a little give and take between independent experts was always a good idea, so that one engineer's economy would not give some other designer an expensive problem. It might be added that an architect is the eminently logical one to take the lead at a meeting of the specialists, provided he keeps his own ideas fluid.

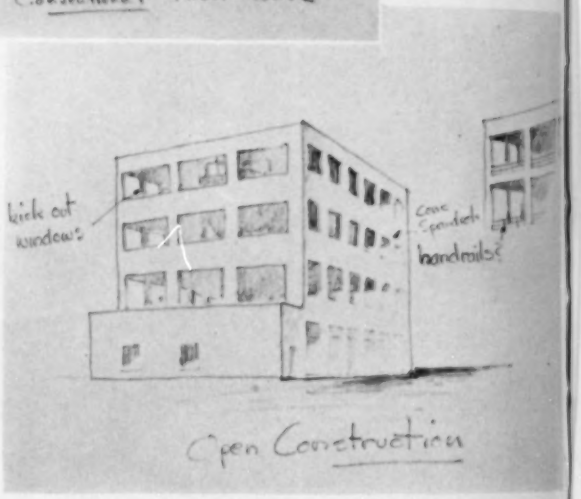
In this case the architect took a large dose of the medicine himself. He started testing ideas by drawing perspectives. In the end a dozen men were doing the drawing, and more than 250 perspectives were made before everybody was satisfied.

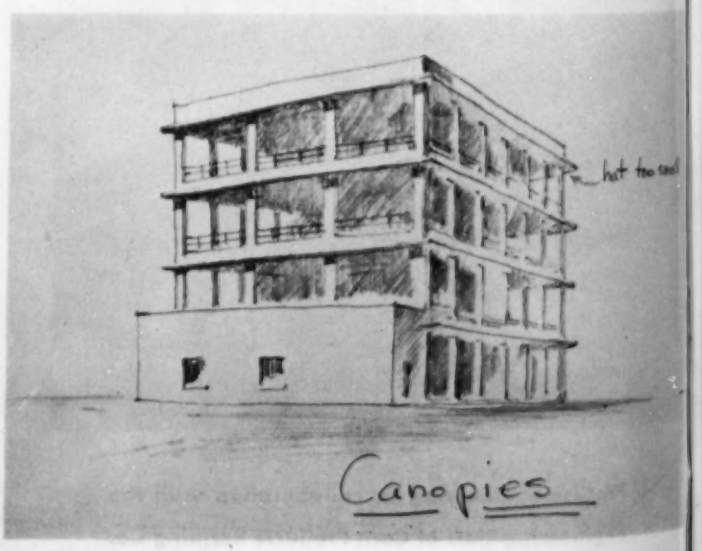
Open construction is not, of course, a new idea. It has been used for 30 years or more for transformer substations, for oil and chemical refineries. This is, however, the first time it has invaded the ancient milling industry. It will certainly invade others.

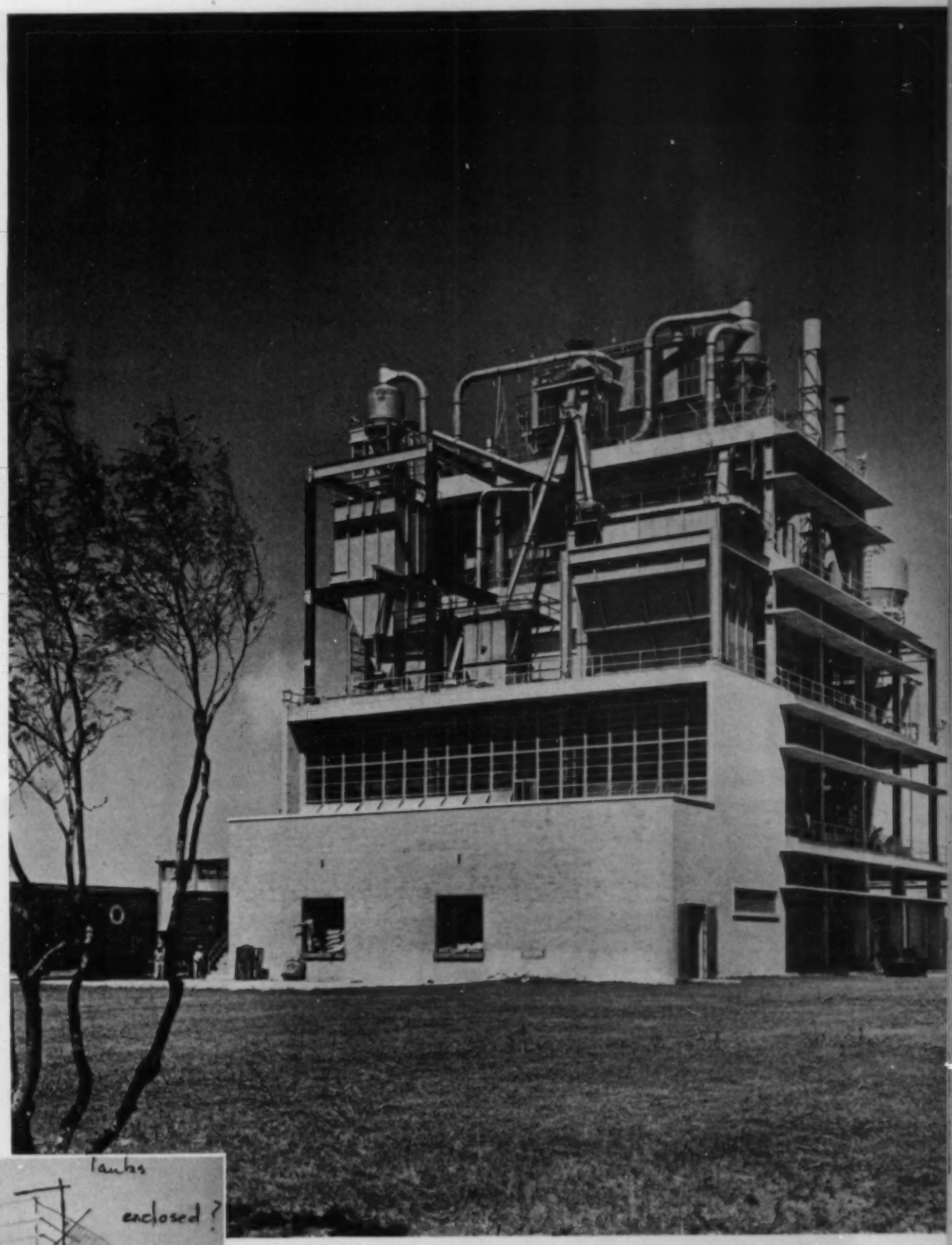
One interesting speculation is its effect on corporate thinking in such matters as taxation and obsolescence. The same management that would quickly junk an obsolete machine will cling steadfastly to equally obsolete buildings. Machines are retired rapidly on the company books (also in tax calculations), but buildings are expected to last at least fifty years. Ancient buildings have frequently become a major block to efficient production. But make the building part of the machine and the thinking begins to change.

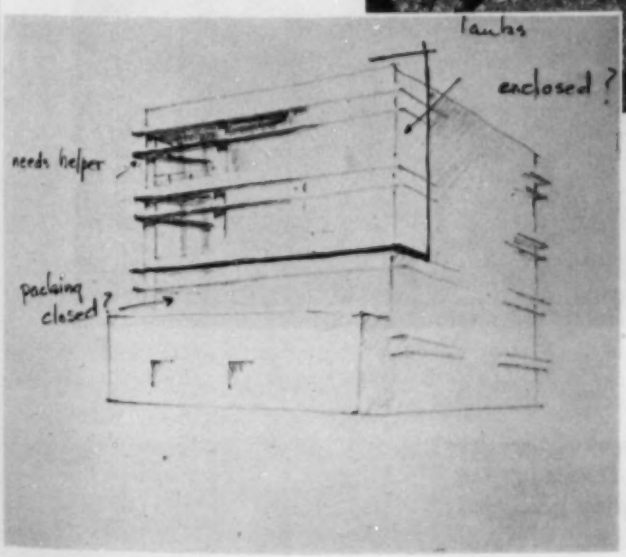
Certainly the integrated design concept, of which open construction is but a small part, is never to end. It will hold sway increasingly in this and every other industry, and in every other field of design and construction, with this project contributing mightily to its further acceptance.



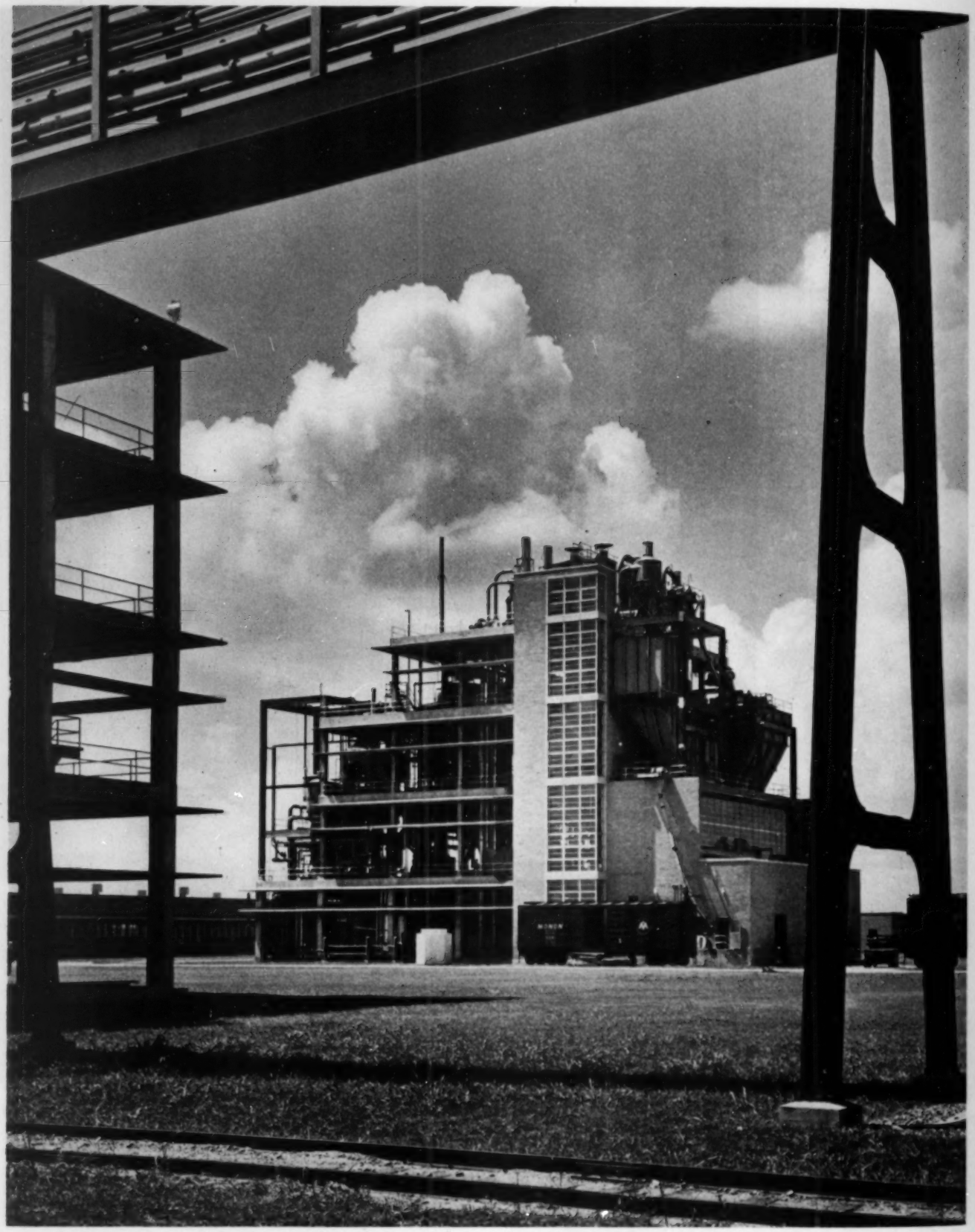




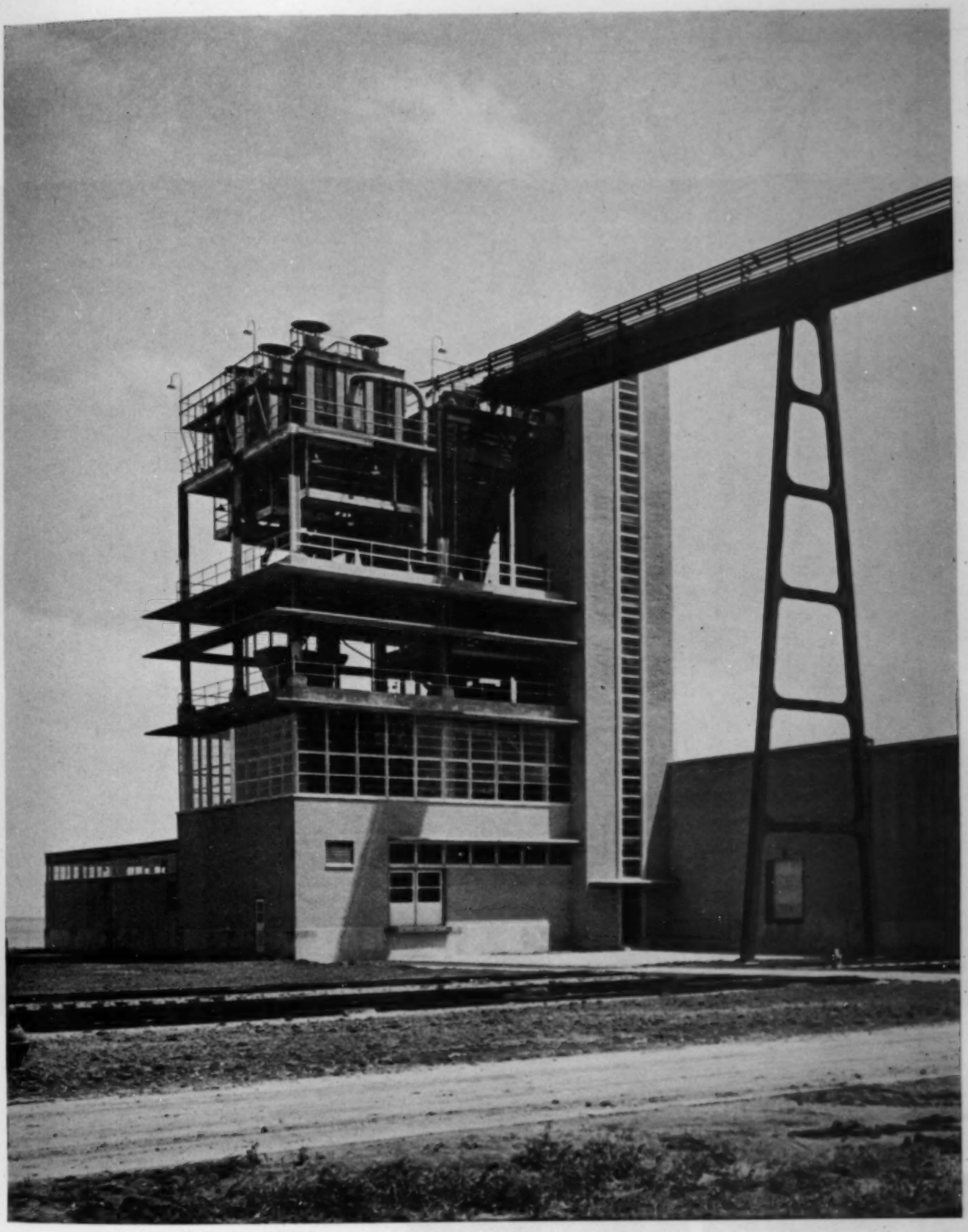




Evident in the sketches is the design process by which the mill type building, upper left, the conventional starting point, gradually changed on the drawing board into the modern feed house in the photograph. Acid fumes and dust, familiar hazards of milling industries, led to the first major step—elimination of windows. From there on the principle of open construction went forward to its logical conclusion—leaving exposed all possible processes, enclosing with walls only those really requiring it



The enclosed portion of the Feed House is the packaging department, since the packing operation cannot, of course, have an integral housing of its own. The vertical form seen on this and other buildings houses stairs, instrument rooms, and frequently a "man lift," a sort of vertical human conveyor



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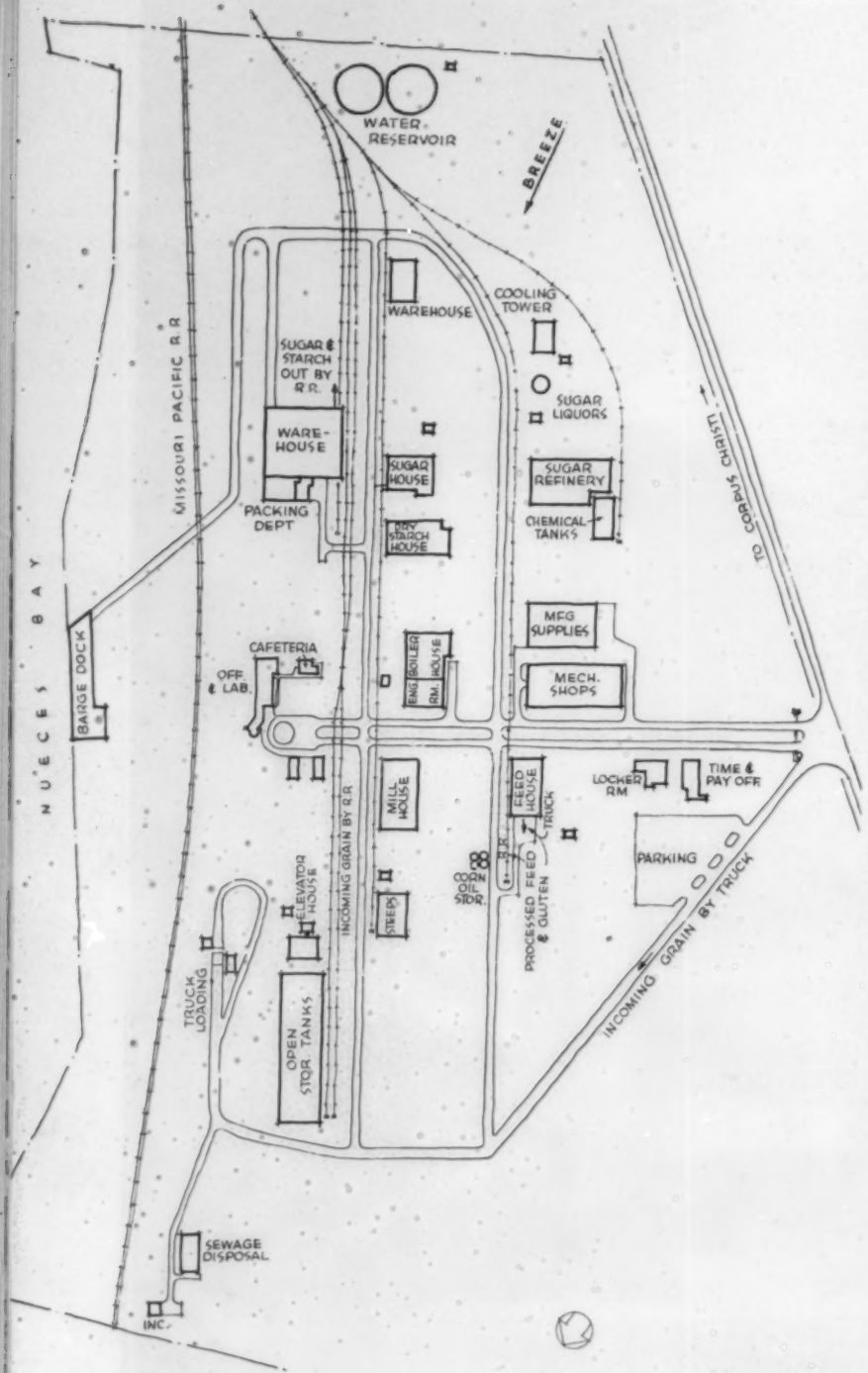
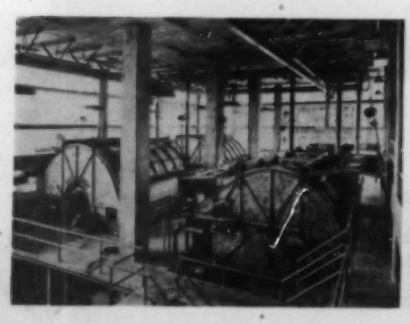
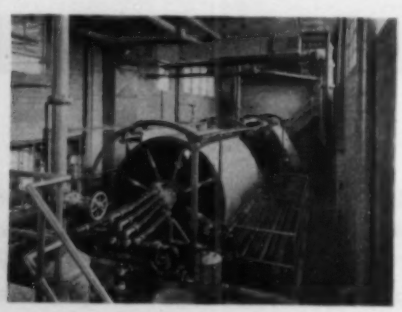
The Packing House, where sugar and starch products are weighed and packed for shipping, similarly required wall enclosures for final operations. Even here, however, it was possible to leave much of the machinery enclosed only by its own housing. Sugar and starch reach the building through overhead pipe lines







The two filters at the left are typical of the reasoning in open or closed construction. Filter at the right comes at a final stage; it is important that it be protected against dust contamination, so this one is enclosed by a complete structure. The one at the left comes much earlier in the process; an integral machine housing is adequate

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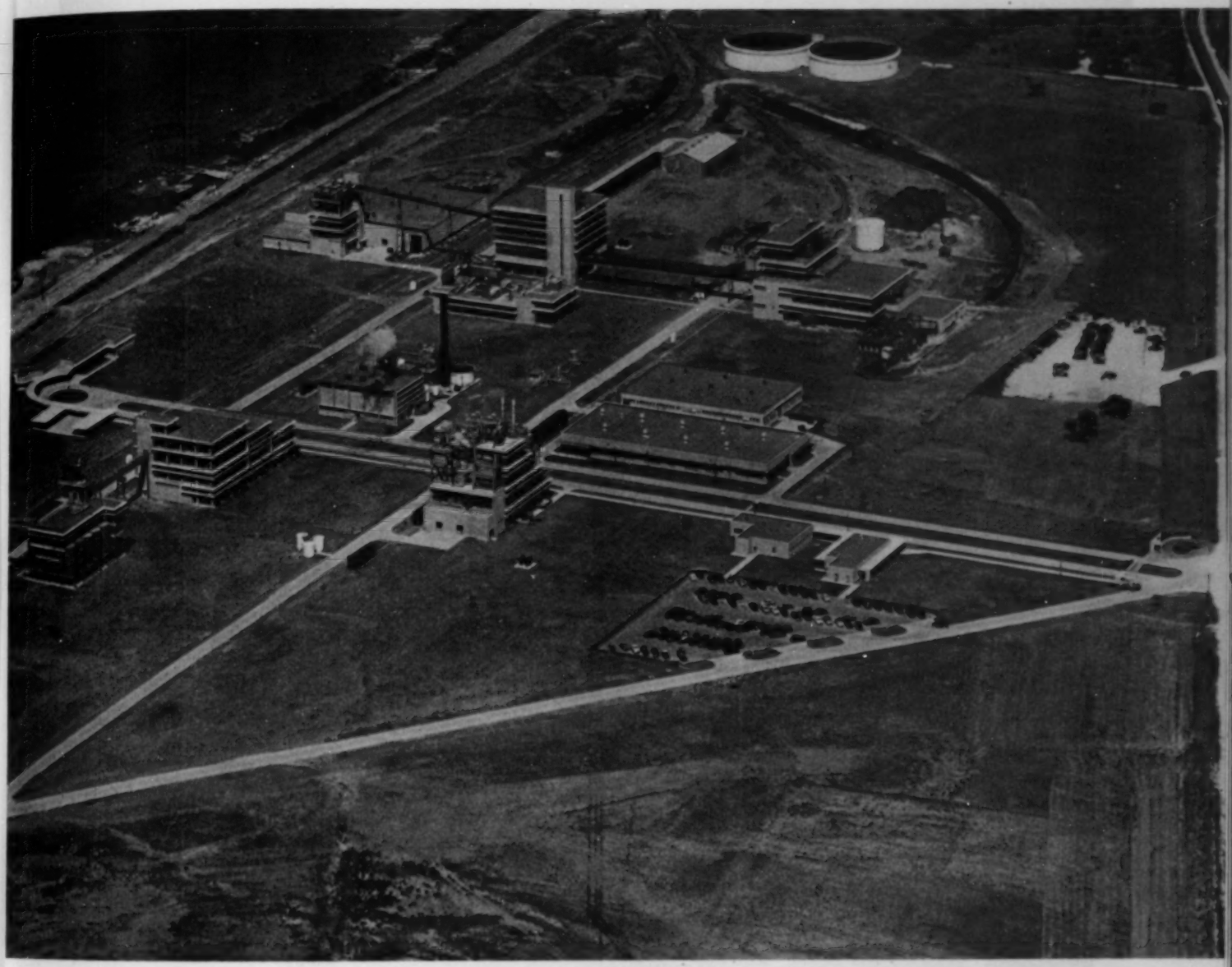
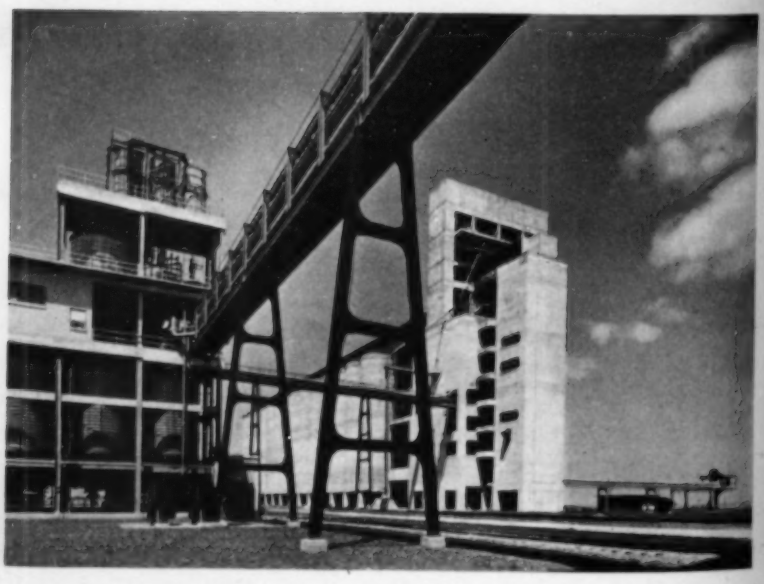


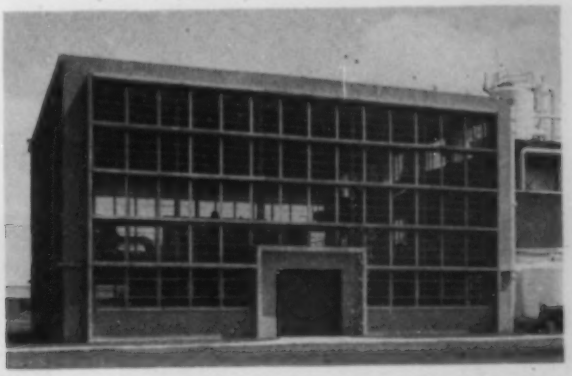
Buildings are widely spread on a 140-acre site to leave room for "expansion" without disturbance to existing flow lines. While some of the grain comes in by truck in the harvest season, much is brought in by rail, and there is a possibility of unloading from barges; hence the location of the grain storage silos. From there it is pumped through pipe lines to the steep house and to other processing units. Location of the administration building (the low, curving structure overlooking the bay) is somewhat unconventional. Main entrance is the focal point of roads at the far right; employees enter here, go to time and pay office and locker building (near foreground parking lot)

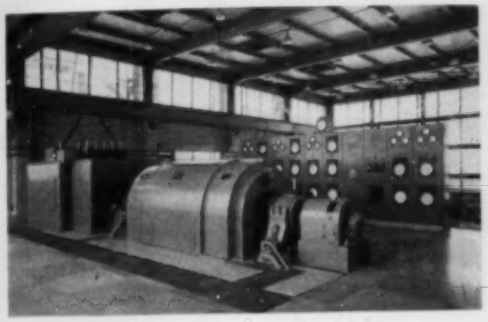
Nobody could advance a sound reason why, in the Texas gulf climate, the boilers needed a building enclosure. So the "boilerhouse" becomes an open array of boilers, with the stack rising from ground level. The generating plant, at the left, needs a full building

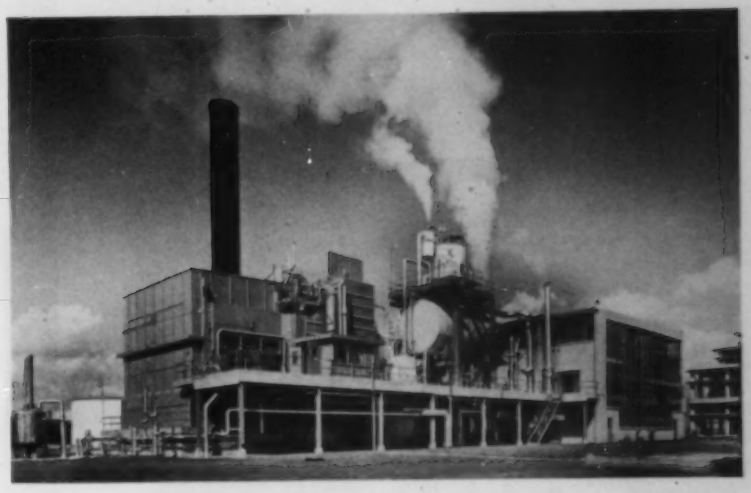
The Steep House (night view, far right) illustrates advantages of open construction. Processing begins here, with grain mixed with a solution of dilute sulphuric acid. Fumes ate out windows in older plants, made working conditions uncomfortable. So the windows were left out; as the first idea, then the spandrels, then the walls were completely omitted. In the end the "building" became just a platform, a roof and some sunshades. Even stairs are open



Interior of the power plant (below) illustrates the attention given to both clean appearance and cleanliness of operation. The rigid bents of the roof framing contribute to clean appearance, the terrazzo floor is both attractive and easy to keep clean. Since the plant has been in operation the management reports a general enthusiasm among workers; cleanliness is easy







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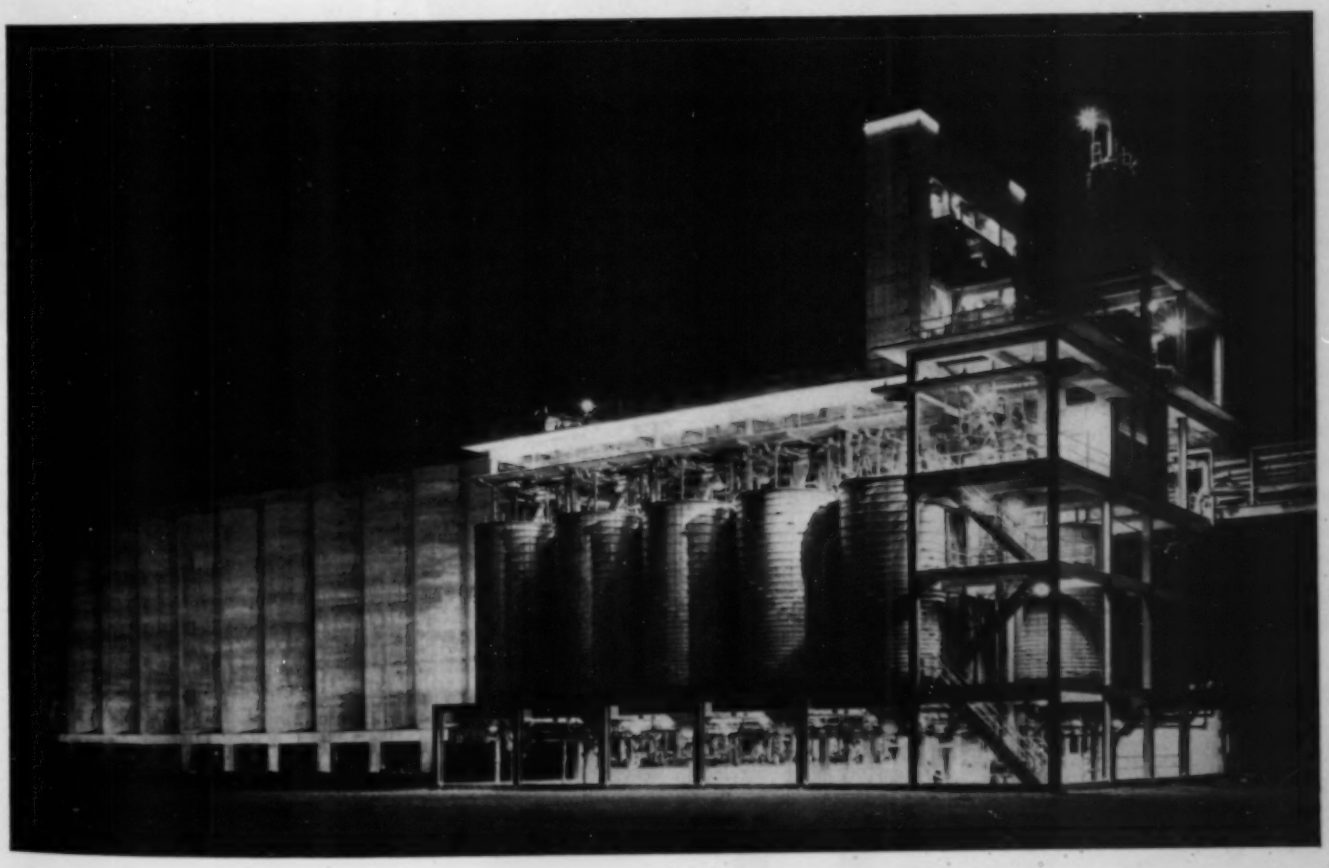

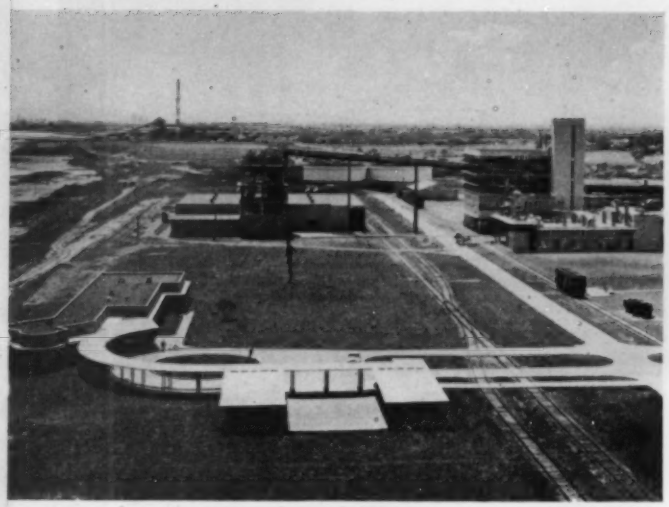

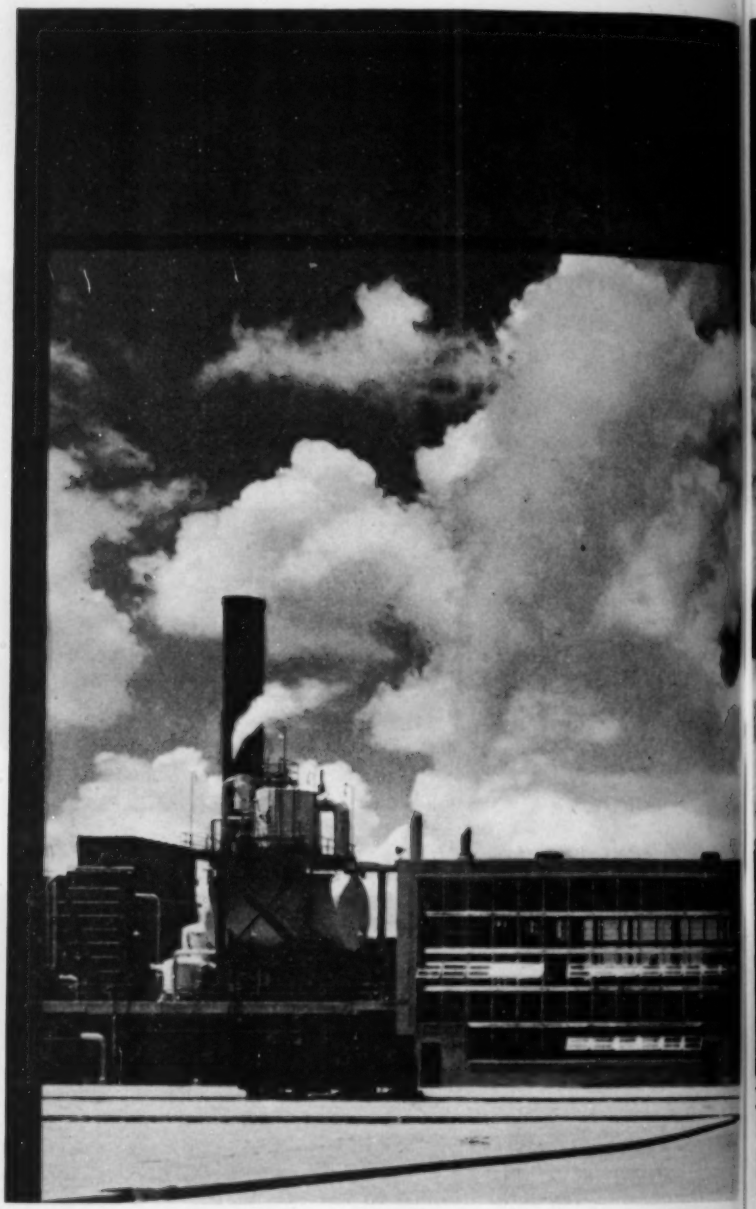

The small administration building enjoys a vantage point overlooking Neuces Bay near Corpus Christi. It is also placed to provide an open view of much of the plant (views on opposite page). Looking down the wide roadway the power plant with open boiler house is seen at the left. At the right, the Mill House, with Feed House in the background. Tall building seen in the smaller view is the Elevator Building, in front of the storage silos. The curving shelter leads from administration building to carport, to protect the office and laboratory personnel against the hot sun and torrential, sudden rains of the Gulf climate

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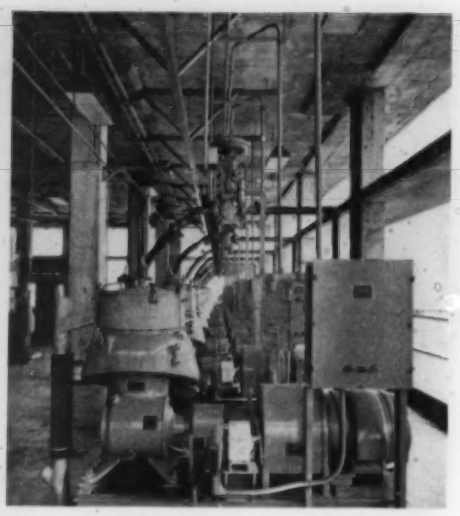
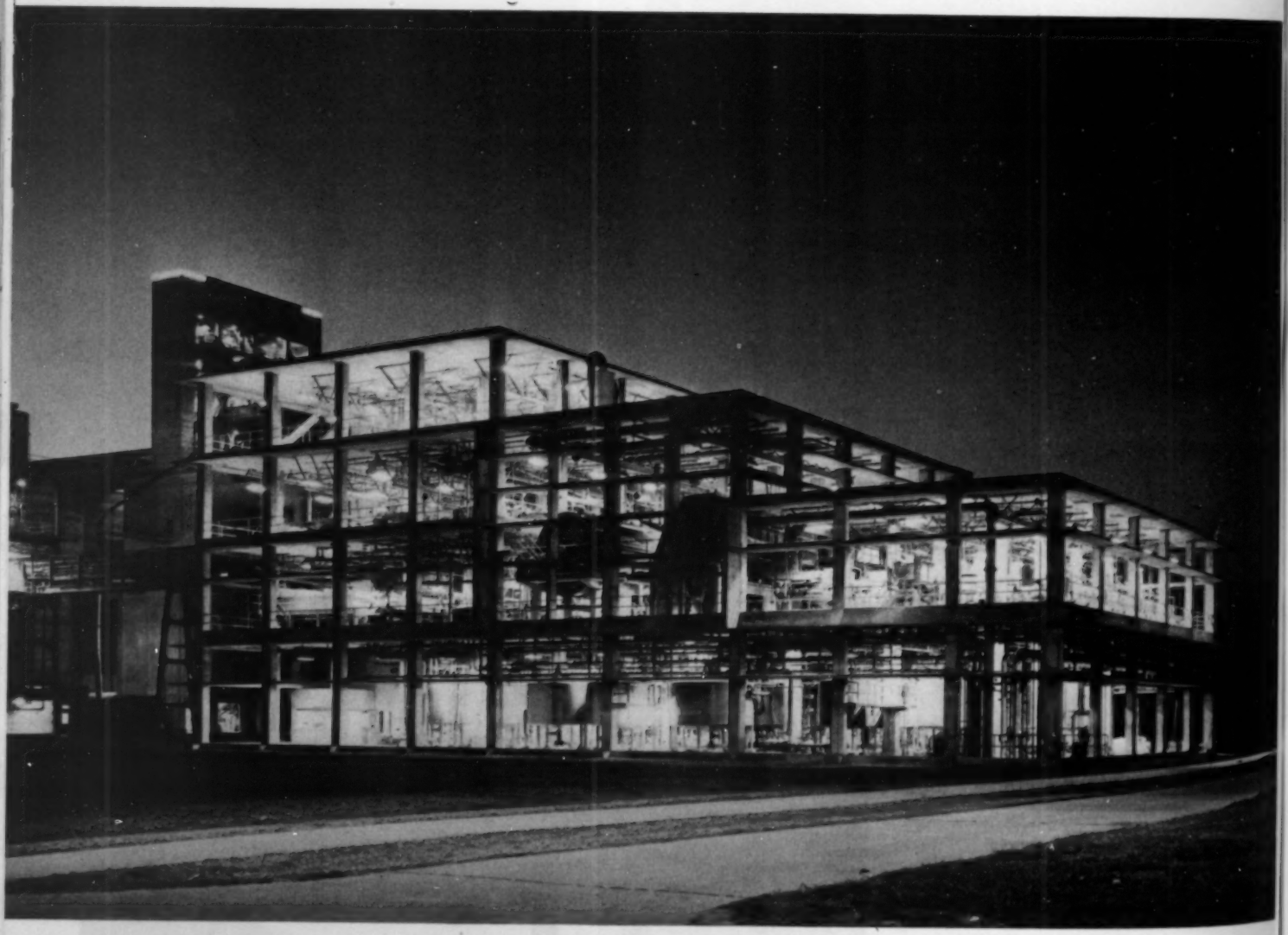
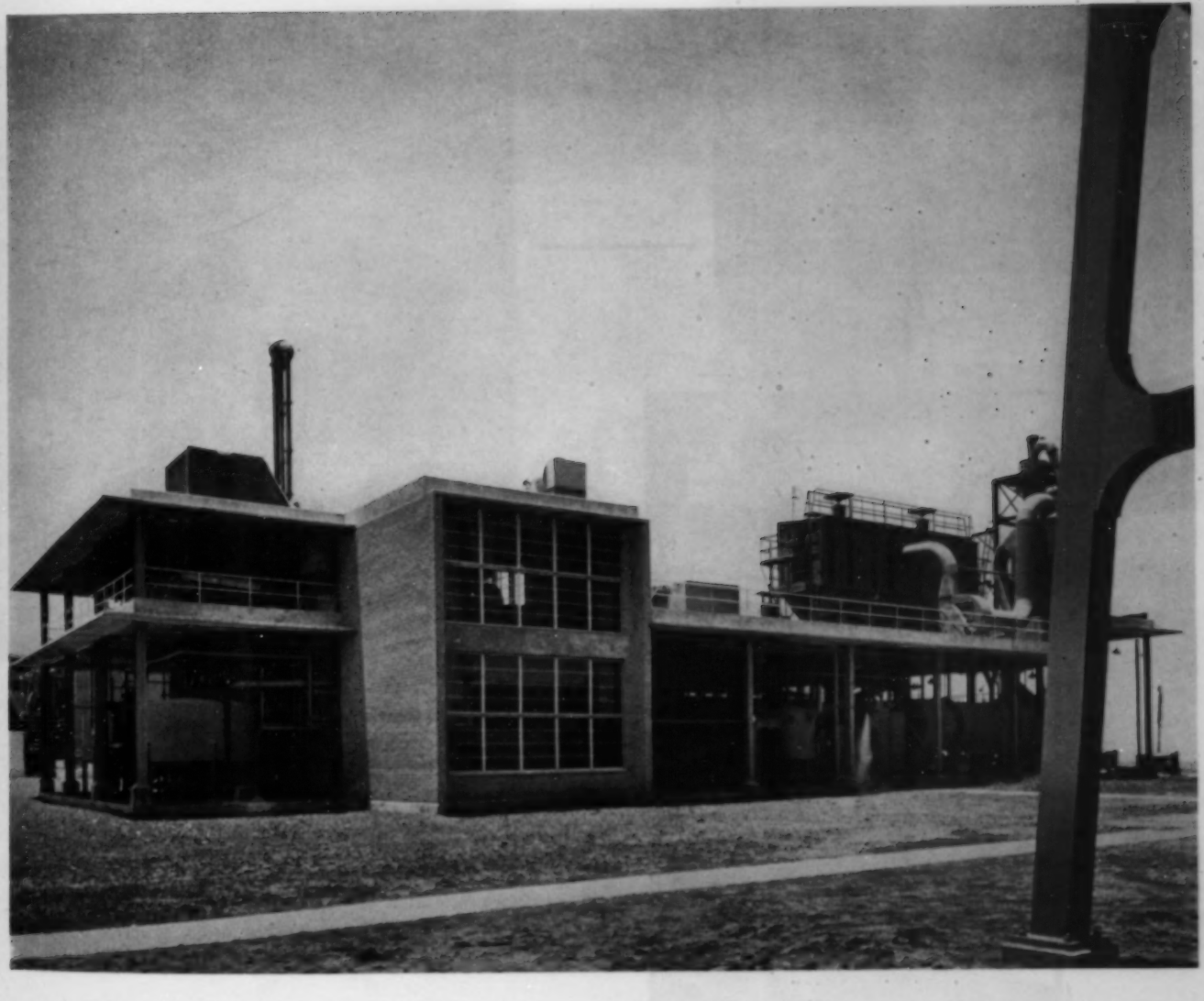
Elwood M. Payne Photos

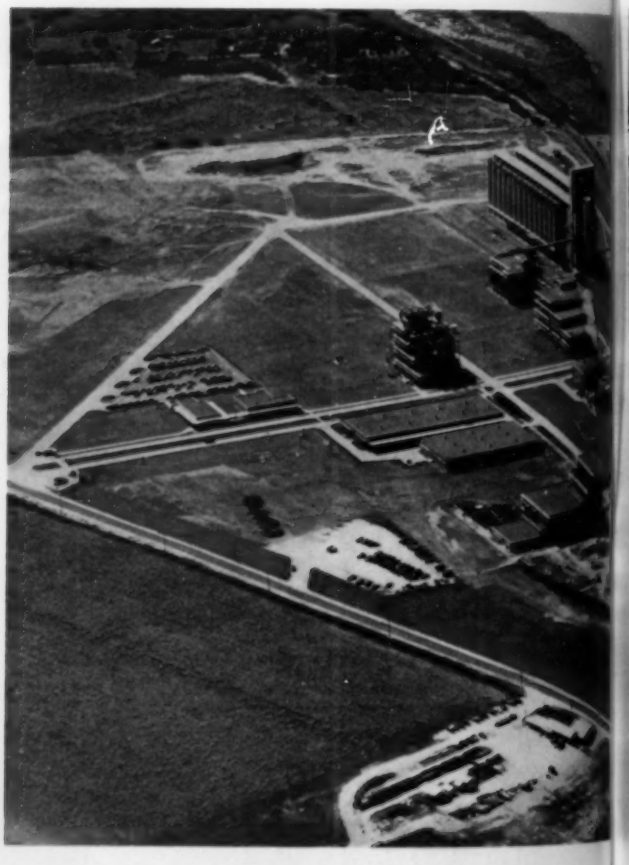


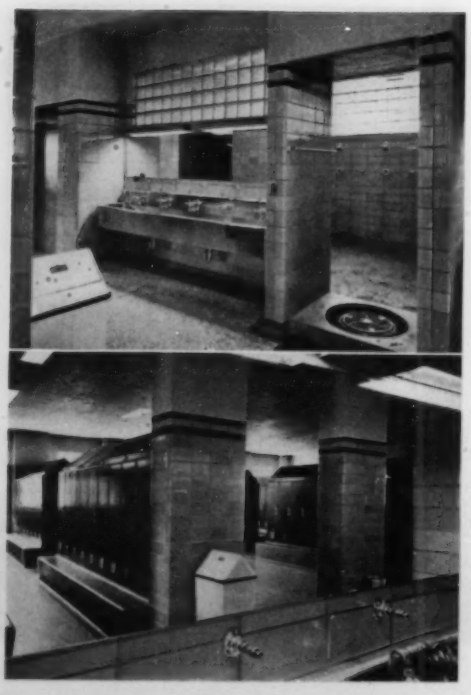
The motors in the row at the left get along with just the protection of the roof and sunshades in the Mill House (night view below). Here grain is broken down into its component parts: starch, gluten, germ and hull, which now go separate ways for processing. On the opposite page, top, is the Crystallizer Building, one of the most typical examples of open construction, with instrument rooms, toilets and stairs enclosed in the tower portion. Notice that, from the standpoint of design, the vertical section provides something for the sunshades to tie to, keeping horizontal lines from forming a "stack of pancakes." The lower building (bottom, opposite page) is the Dry Starch House, where product is dried by screening, vacuum and continuous ovens



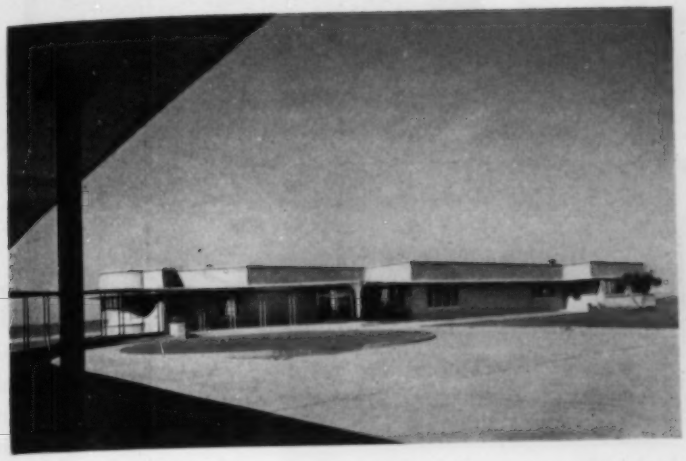


First building in from the main entrance is the time and pay office, housing payroll, employment and personnel offices, also a complete first aid station for workers





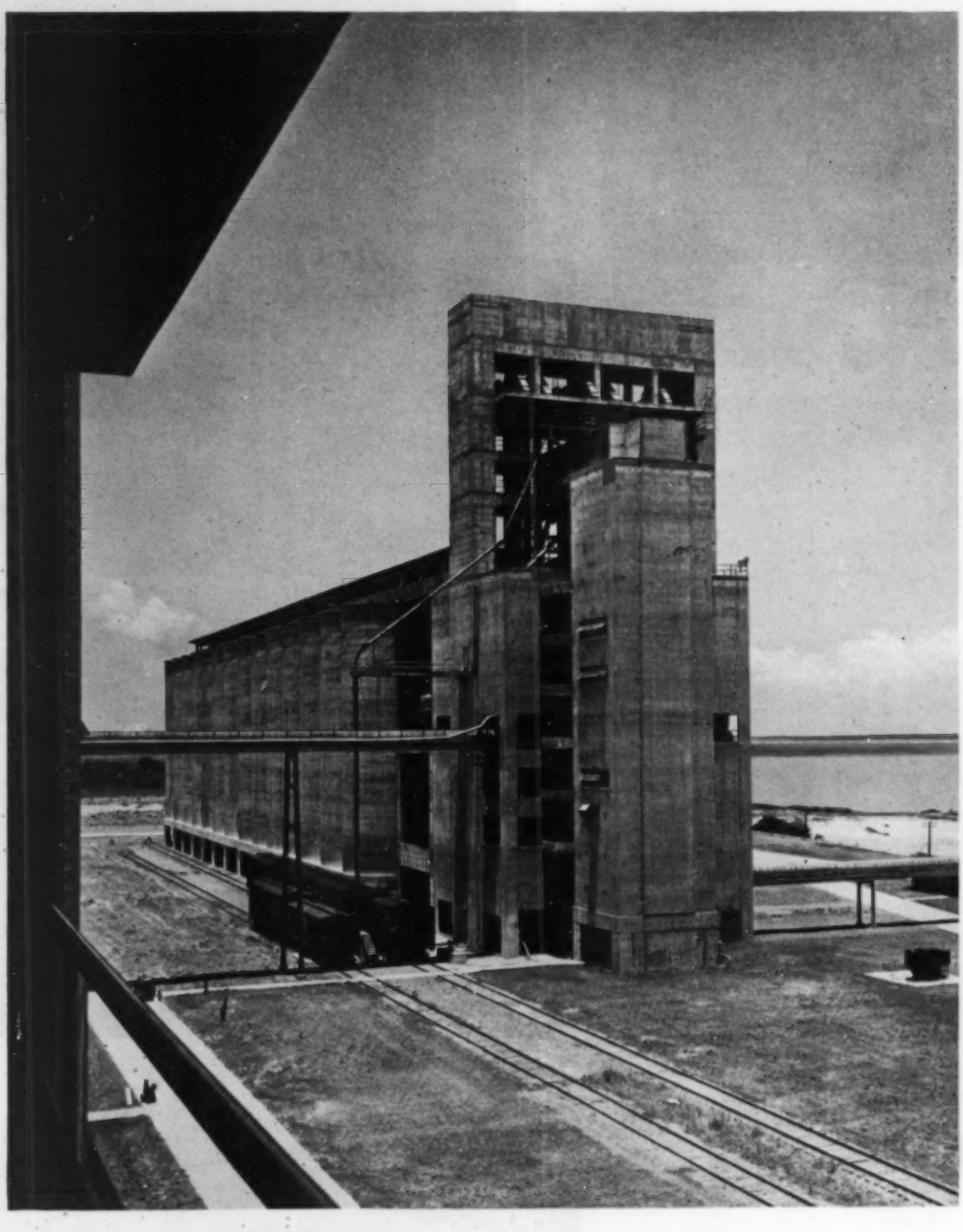
In the Locker Building, all locker rooms are completely air conditioned; a supply of cool air is directed through each individual locker. Walls are glazed tile, floors are terrazzo, and all wash facilities are of stainless steel



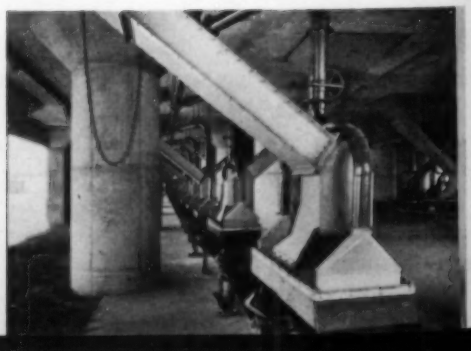
The Administration Building is also fully air conditioned, for good working conditions in the hot Gulf climate. The heat also explains the sheltering of walkways around the building. The control laboratories are included in the administration building.

Open construction proved a handy idea at the huge Elevator Building with its grain silos. Dust is one of the worst hazards, particularly around the long conveyor lines. So here it is sheltered enough to keep off rain, but open enough to let the breezes keep it free of dust, as a sort of automatic housekeeper

Elwood M. Payne Photos



Above: Problem—find the water tower. Instead of a corn syrup can on a steel stand, the water tower is simply a horizontal capping atop the elevator building. Right: a favorite idea of one school of architects—a building up on stilts—here is handy to permit the breeze to prevent a dust hazard under the silos



THE DESIGNING OF INDUSTRIAL BUILDINGS

By Kenneth K. Stowell — *Giffels and Vallet, Inc., L. Rossetti, Engineers and Architects*

If there is one type of building which is now thoroughly and proudly "functional" in its design it is the factory. From first to last, inside and out, it is an orderly, logical correlation of elements having an absolute unity of purpose, each element contributing its share to the one end — *efficiency of production*. Efficiency means not only lower unit costs, increased production, and the maximum effective use of machinery, power and skill, but improved working conditions, public relations and company prestige. Space, structure, and equipment are planned to produce the environment and facilities that in every way will conserve time, energy and materials and will contribute to both the quantity and quality of the product and the success of the enterprise.

In good factory design architecture and engineering are one, integrated and coordinated, developed organically as a collaborative project. Such design requires the services of a competent group, each an expert in a special technical field, each experienced in dealing with a particular phase of the whole and accustomed to coordinate his work with that of the others. Each must have an open and inquiring mind, an understanding of the project as a whole, and the imagination and ingenuity necessary to integrate his part of the solution with all the others. And the earlier in the development of the project the group gets together the better, even before the site is chosen.

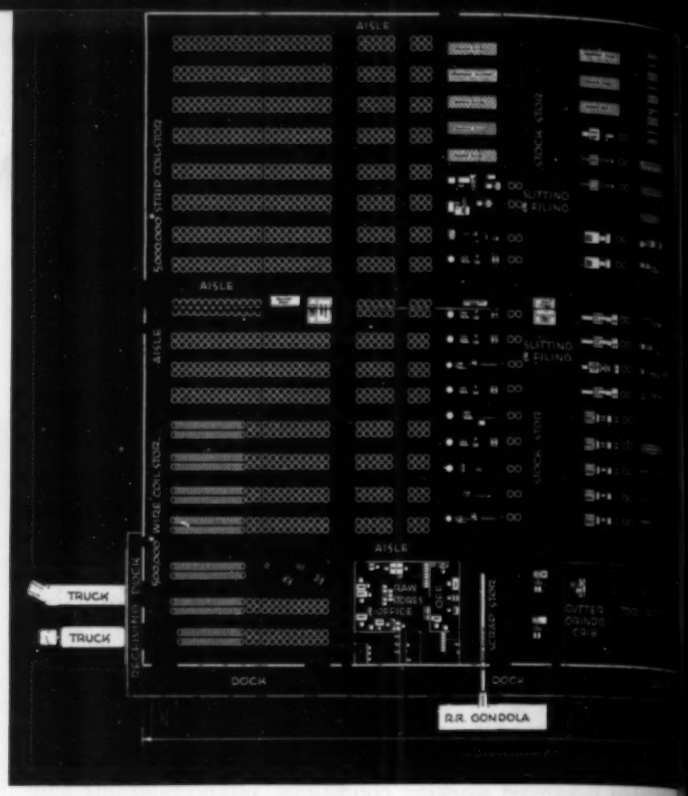
The Site. The owner and his production engineer together with the architect and the engineer group of the design firm have many factors to consider in the survey of possible sites — physical, economic, legal, social, site size (for parking and future expansion), climate, land topography, soil conditions, availability of raw materials, water, waste disposal facilities, labor markets, transportation, power and fuel, tax conditions, comparative land costs, etc. These are too numerous to consider in detail here but are of prime importance to the success of the project, and vitally affect the design of the plant, its equipment and its cost. The general arrangement of the manufacturing processes and the flow of materials should be determined before the site is selected to be sure that it lends itself to an efficient arrangement of processes and flow.

Design, Analysis and Procedure. Once the site is chosen the first task of the designers is to determine precisely, accurately and in detail the present and projected manufacturing processes and the machinery, space and facilities involved. It is at this stage that the experience, knowledge and imagination of the designers yields dividends. Changes in lines of flow, suggestions for new time-and-labor-saving machinery and for space-and-time-saving arrangement and rearrangement of space are made at this time. This basic "development engineering" constitutes the essential planning which determines the size, shape, structure and equipment of the plant and its surrounding areas. The study of plant layout is thus an inevitable integration of architectural and engineering planning.

This determination of the plan that will prove most efficient in its provisions for men, materials and ma-

Plant Layout with Templates.

The design of a factory begins with analysis of processes, flow charts and template layouts of machinery

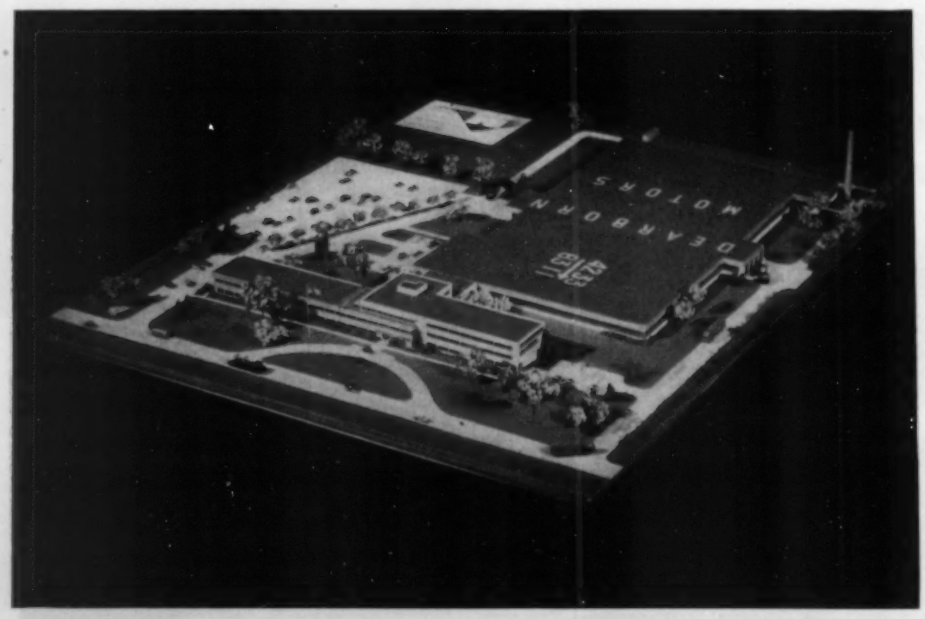


Template Layout.

Example of completed layout for a plant making coil springs. The left third of the diagram shows storage area for material to be processed (wire coils), which moves via overhead cranes to various process machines — slitters and filers, etc. Center third shows hardening furnaces, then a row of polishing machines. In the last third are grouped a wide variety of smaller machines and process operations

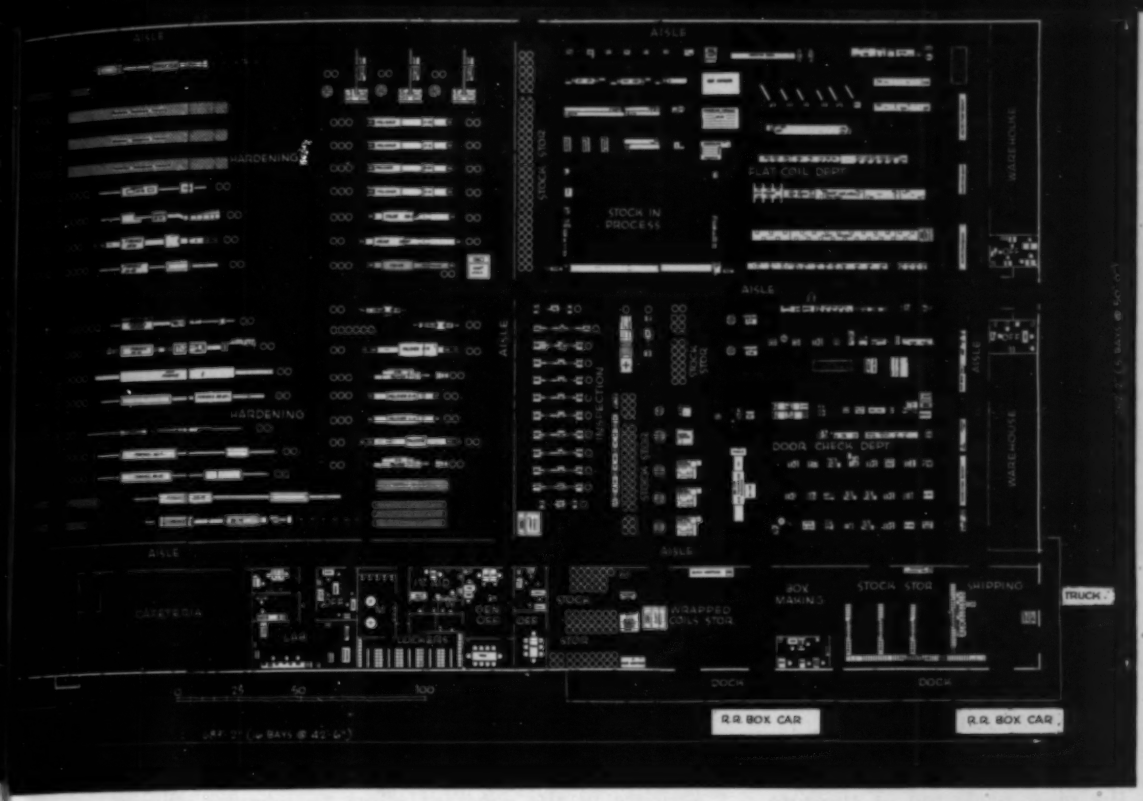
chines, is best achieved by employing a template method. Each machine and the surrounding area for its operator and for its raw and finished materials, plus its serving conveyors, etc., is accurately shown by templates, or models, at suitable scale, so that each piece of equipment may be arranged and rearranged with the others until the best organization of equipment and space is achieved. It is at this early stage that each of the experts in each field can make his most effective contribution and constructive suggestion. It is then that teamwork counts and such compromises as must be made will be in the best interests of the project as a whole. It is there that the difficulties of integrating all the component parts can be most easily adjusted for simplicity, orderliness and economy. Each expert from his standpoint can then analyze the plan, foresee possible difficulties and discuss with the others suggested better solutions. Problems of power-distribution, lighting, air conditioning, materials handling, waste disposal, dust-and-fume control, maintenance, employee traffic, safety, column-spacing, structure and all the rest are threshed out, for each affects the others. In effect both the designers and the managers of the proposed plant here visualize every possible aspect of its operation and arrive at definite conclusions.

It is at this stage too that provisions are made for flexibility and expansion, for the inevitable changes that must be made subsequently to keep the plant al-



Three-dimensional Studies.

Study of entire plant in models helps both designers and owners to visualize the project and to make final decisions. Model of Dearborn Motors plant, Dearborn, Michigan



ways abreast of the new processes, new machines and better techniques that characterize our industries.

In factory planning the paring down of floor area — or the crowding of machines to save cubage and first cost — may well prove expensive in the long run if it slows down production or prevents rapid changes as new processes are developed, new models or products are to be made and new machines installed. For instance, wide aisles (even wide enough to accommodate whole machines in case of replacements of breakdowns) many times have saved their cost in cubage by saving shutdown time, and by permitting freer, faster and less hazardous movement of men and materials. Freedom from breaks in the continuity of operations is essential in modern mass production, and space planning is a vital factor both in promoting uninterrupted processes and in providing flexibility for change and expansion.

Employee Facilities. Both the quantity and the quality of the product depend not only on the sequence, precision and efficiency of the factory's tools and machines but on the proficiency, pride and physical fitness of their operators. So the development of factory design has been concerned more and more in recent years with optimum conditions of light, heat, humidity, air conditioning, acoustics, safety and warning controls, dietetics and cafeterias, locker and rest rooms, recreational facilities, first aid stations — all of which contribute to the workers' comfort, well-being and consequent

Layout Outside the Plant.

Air view of steel fabricating and assembly plant for Caterpillar Tractor Co., Peoria, Ill., showing outdoor storage in foreground, ventilating fans and unit substations on roof

Choice of Materials.

Simple, unbroken brick wall, Studebaker Corp., South Bend, Ind.

Glazed walls, plant for Ford Motor Co., Dearborn, Michigan

effectiveness. Perhaps the most neglected of these to date is the matter of sound control and its relation to both first cost of the plant and to potential increases in quantity and quality of production. We can expect further developments in this field.

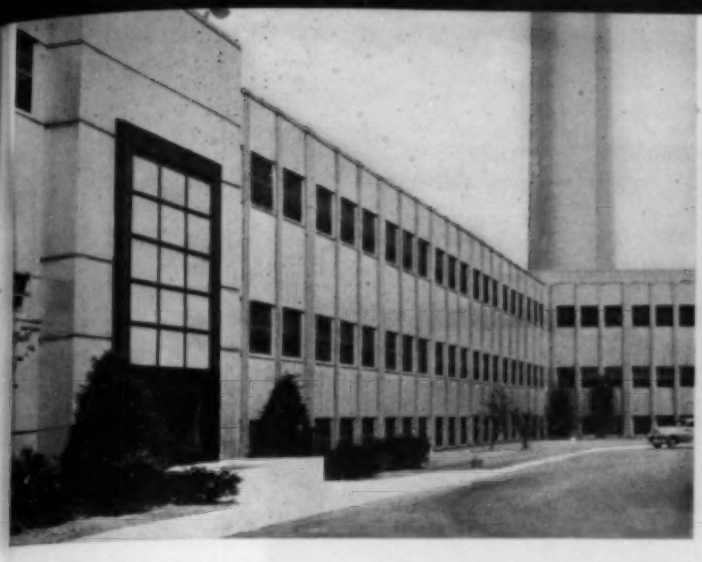
Considerations of factors involving better working conditions are not to be afterthoughts to be "fitted in somehow" after working drawings are well along, but should be part and parcel of the original planning studies.

Current Trends. While there are no "revolutionary" developments in the design of industrial plants at the moment, there are certain recognized trends. Most of these are in the nature of evolutionary changes, and, because they affect many or most of the parts and details of the plant they do influence the current design pattern.

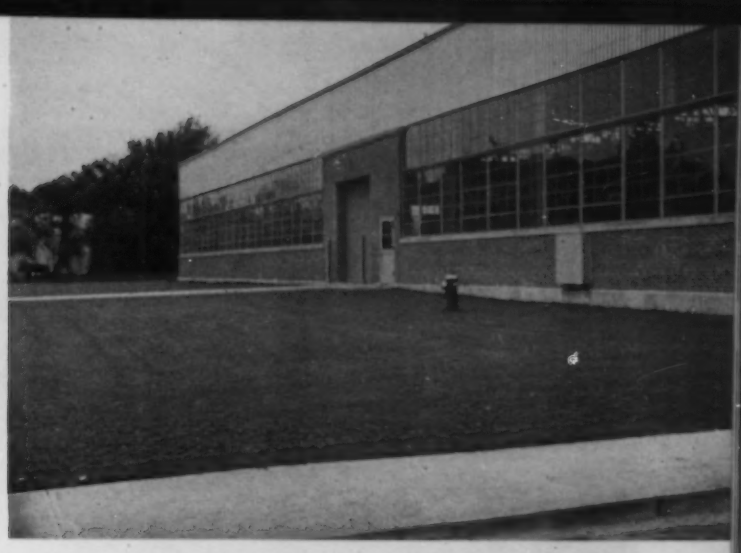
To mention a few trends resulting from recent experience in the constant effort to increase efficiency, there is the almost universal adoption of the single-story building rather than the old multiple-story structures except where certain processes require the latter. The one-level floor plan not only facilitates efficient arrangement of parts lines and assembly lines, but also provides for ease of material handling by conveyors, cranes, monorails and especially by the improved varieties of lift and platform trucks. The use of skids and trucks permits high stacking, as well as convenient transporting of materials, thus using space up to the trusses or girders and conserving floor area. Expansion and addition to a single-story building are usually much easier too. The "one-level" designation is not strictly accurate because mezzanines, tunnels and some basement and penthouse areas are frequently employed to conserve cubage and to keep auxiliary services adjacent to the areas they serve. Employee facilities and offices,

Gottscho-Schleisner Photo

Entrances *no longer need be monumental and elaborate. Simple, intimate, "human scale" design consistent with entire plant is the rule. The first one at the right is the entrance to an employees' building at Electronics Park, Syracuse (General Electric Co.); those on the opposite page are main entrances to factory office sections*



Aluminum panels, Federal Telecommunication Lab., Nutley, N. J.



Metal, glass and brick, Wallace-Barnes Div., Bristol, Conn.

for instance, are often placed on mezzanines, and fans, air conditioning apparatus and substations in penthouses.

Then there is the increasing dependence on mechanical rather than natural means for "controlled environment" in lighting, ventilation and air conditioning. Windows frequently are employed more for their psychological effects, to remove any feeling of claustrophobia, than for the lighting of tasks, since artificial lighting is more uniform and is necessary in any event for two or three shift operation. Colors, light and cheerful, are more universally used because they encourage orderliness and neatness, increase efficiency, promote safety and enhance morale. Also colors used as a means of identification save time, reduce errors and prevent accidents.

Structure. Structurally, the plant today is usually of steel frame, trusses (both riveted and welded, of ever wider spans) covered with flat roofs of prefabricated units; curtain walls of insulated metal (or other sheet materials), glass or masonry; and floors of concrete finished integrally or with wood, tile or resilient flooring. Exterior walls, where not subject to impact injury, are increasingly designed to be of lighter, larger manufactured units rather than of heavier masonry. These offer a wider palette to the architectural designer in addition to saving weight, time, and, in many instances, first cost.

Electrical Distribution. Electrical distribution systems are now designed for flexibility and ability to meet varying load conditions at a minimum cost, and for reliability, good voltage regulation and elimination of shutdown in case of difficulties in local circuits.

It is customary now to bring in the primary power supply and to use a number of unit substations from which the low voltage is distributed. These substations

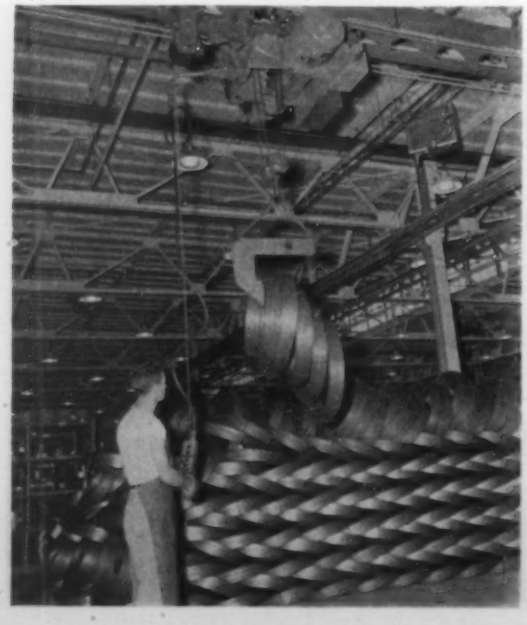
Lens-Art Photos

Daylighting. *Main shop bay showing high level natural light and unobstructed plan, permitting changes in processes. Ford Motor Co., River Rouge plant, Dearborn, Mich.*

are completely prefabricated into compact assemblies for ease of installation, low operating and maintenance costs and ease of operation. The location of substations and their support must be taken into consideration in the general planning, and frequently floor area can be saved by locating the substation in a penthouse or on a mezzanine. For maximum flexibility and to facilitate machinery rearrangement, plug-in bussways have become popular. There is also a trend to create control centers centrally located with the equipment they serve so that both installation cost and space are conserved. The recommendation of the electrical engineer who designs the system of power distribution and of lighting is naturally correlated, therefore, with the work of the process engineer, the structural engineer and the architect, in the planning.

Industrial Illumination. The system of factory lighting to be adopted depends for both the quality and the quantity of light upon the task to be performed within the various areas of the plant. Brightness ratios are

Materials Handling. *Overhead crane stock piling spring coils. Wallace Barnes Div., Bristol, Conn.*



Here the conveyor is merely a suction hose, moving powdered material from enclosed railroad siding platform. Bakelite Corporation, Ottawa, Illinois

Hedrich-Blessing Photo

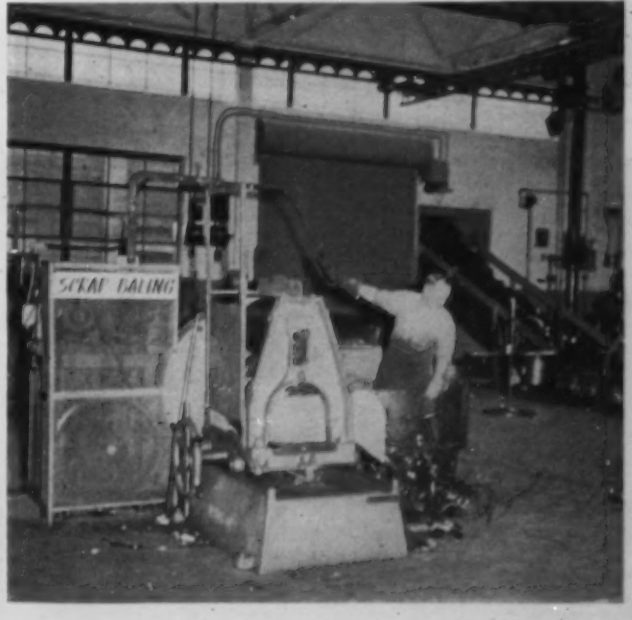
Artificial Lighting. *Assembly floor in air conditioned multi-level plant with interior lighting of high intensity. Ford Motor Co. Aircraft Building, Dearborn, Mich.*

as important as light intensities. Both intensities and brightness ratios are affected by the use of color in the plant, and higher reflectivity from the ceiling, floor, walls and the machines themselves naturally cuts down the necessary lighting load.

Vapor tube lamps have become increasingly popular because of their high efficiency. Mercury vapor lamps are used frequently, especially where accurate control and distribution of light are necessary from high-mounted fixtures. Incandescent lighting is frequently used in connection with these lamps to produce a more pleasing color and quality of light. Standard fluorescent, slimline and cold cathode lighting are competing for popularity as the source of illumination of general industrial areas. Baffles and shielding of various types are necessary sometimes to prevent glare and to protect the eyes of the worker from direct exposure to the source of light.

Architectural Pattern. From an esthetic standpoint the contemporary large plant involves a somewhat different conception of scale and detail than the more usual small buildings. The larger plant becomes almost a problem in city planning, with its traffic control problems, its highways, railways and in some cases waterways; its parking for staff, visitors and employees; its provision for storage of raw materials and finished products; its space for employee recreation, its landscaping, its safety and security measures; all problems which do not deal directly with the actual manufacturing process. Industrial architecture is thus space planning on a large scale, not just the design of buildings. It is one thing to make an integrated design of a structure that can be taken in at a glance but quite a different problem to deal with buildings which run to hundreds and often a thousand or more feet in length. An elevation of a thousand feet or so broken by trucking doors, pedestrian doors, penthouses, expansion joints, monitor ends and crane tracks, and further complicated by changes in plane and height dictated by the processes enclosed, certainly presents a difficult design problem. However, in skillful hands a building of these dimensions can be treated in a unified pattern. The very items which initially appeared to be troublesome may well offer welcome relief, opportunities for accent and variation within the over-all design. Though the small-scale drawings will show the entire

Safety. *If the operator of this steel scrap baler should be dragged toward machine, his hand would leave switch, cut the current*



F. A. Russo Photo

Lobby Design.

A bright, spacious, dignified lobby, planned for complete control by receptionist, a necessity where large numbers of visitors are received. Federal Telecommunication Laboratories, Nutley, N. J.

building at a glance, at full scale it is impossible for the eye to appreciate more than a small area at one time in its full detail.

Simplicity of form and mass and directness of expression are the keys to unified and satisfying design. Economic considerations, fortunately, usually preclude the possibility of applied beauty or extraneous ornamentation. The architect must use the materials best suited to their respective purposes to enclose space that is largely determined in form by the production processes to be sheltered. His skill within these limitations is demonstrated by his frank acceptance of them and his bold and sensitive use of the direct, honest approach. The net result is the clean simplicity and strength which has come to characterize American industrial architecture.

It is regrettable that in some cases in the past this excellence of design was marred by inconsistency when it came to the administration building. Too often the client who expected and demanded maximum light, air and economy in his factory buildings did not hesitate to insist upon a "special treatment" of a quite different and less efficient caliber for his administrative areas. As a result the entire plant suffered both in its efficiency and its esthetic character. However, leading industrialists now realize the advantages inherent in the consistent, unified design of all the elements of the plant — advantages in prestige and in the psychological reactions of both the public and the personnel of the plant itself.

The industrial owner's prime purpose is more and better production and the architect-engineer team working together from the start and collaborating at every stage in the development of the design provides the best possible facilities for his purpose.

Employee Facilities.

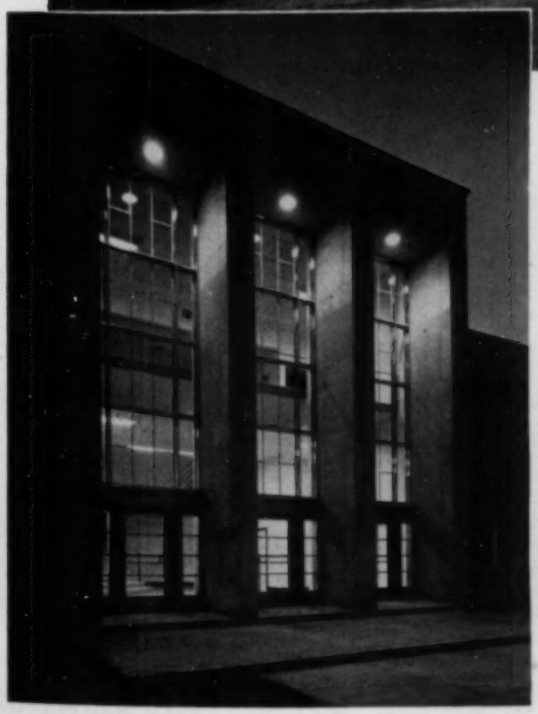
Left, cafeteria designed for comfort, efficiency and ease of maintenance; Electronics Park, General Electric Co., Syracuse, N. Y. Right, wash-up and toilet room, light, sanitary and easily cleaned; Ford Motor Co., Dearborn, Mich.

Gottsho-Schleisner Photo

PRINTING PLANT PLANNED FOR EFFICIENCY

Maclean-Hunter Publishing Company, Ltd., Toronto, Canada

Allward and Gouinlock, Architects



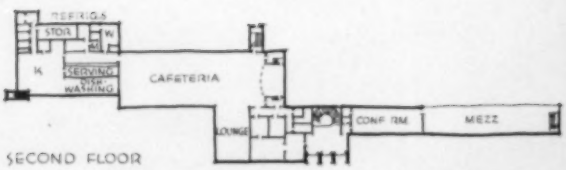
Photos — Left: Rice & Bell • Above: Grant Collingwood

IT is still something of an event when printers and pressmen get sufficient space and efficient production layouts; it seems traditional in the industry that printers must work in buildings practically as old as printing itself. Here is the latest plant to break the tradition; it represents a long and thorough study by both the client and the architects in the interest of efficiency in the production of some 7000 magazines an hour.

The plant, all in a single story, features long spans, large open areas, functional lines of flow, modern materials handling equipment, adequate lighting and ventilation, accurate humidity control, and especial provi-

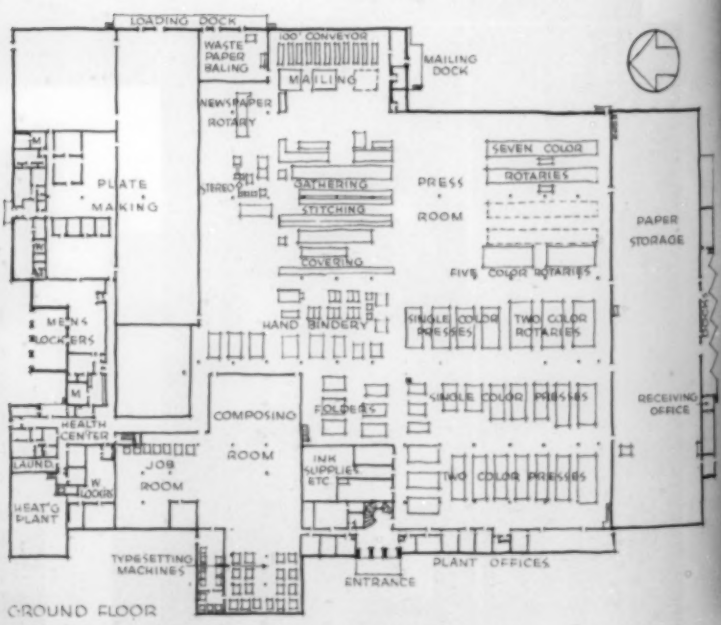
Continuous belt conveyor carries mail bags, some 2000 a day, from the mailing room to a chute leading to truck platform

Mailing room (top, center, in plan below) comes at the end of the magazine "assembly line," handles 7000 magazines an hour



Rice and Bell Photos

Five-color press, for printing magazine covers



Composing room is spacious, unpartitioned

sions for cleanliness, plus employee dining and recreational facilities which printers and pressmen must find quite novel.

Perhaps it was natural that all this should be housed in a building architecturally well-mannered and well composed. It is worth noting, nevertheless, that this was not merely fortuitous; the architects received every encouragement in their efforts to make it so.

Three-ton electric crane handles paper supply

Sawtooth truck dock facilitates unloading

POSTWAR FACTORY CONSTRUCTION

By Eric L. Bird, Editor, *Journal of the Royal Institute of British Architects*

SINCE 1945 new building in Britain has been virtually limited to factories, working-class housing and schools, the first two ranking about equal in priority, with school building a distant third. From December, 1945, to December, 1948, the Ministry of Works sanctioned about £142 million worth of new factory building.

At first sight, these British factories do not present any startling or sensational novelties. Construction is strictly of an austerity nature. There is no money for the more far-fetched experiment which may not come off, nor for architectural frills on the buildings. Structural steel consumption is strictly rationed, and the architect has to account to the materials licensing authority for every ton of steel for which he asks. Consequently, there is at present a keen study of structural techniques, of alternatives such as various new forms of concrete construction and aluminum framing. The high price of fuel is also affecting structural design so that much closer attention is being paid to heating, ventilation and insulation than in the past. Fuel consumption, for instance, in a large factory has been halved by insulating the roof, at a cost which will be covered in three winters by the money saved on fuel.

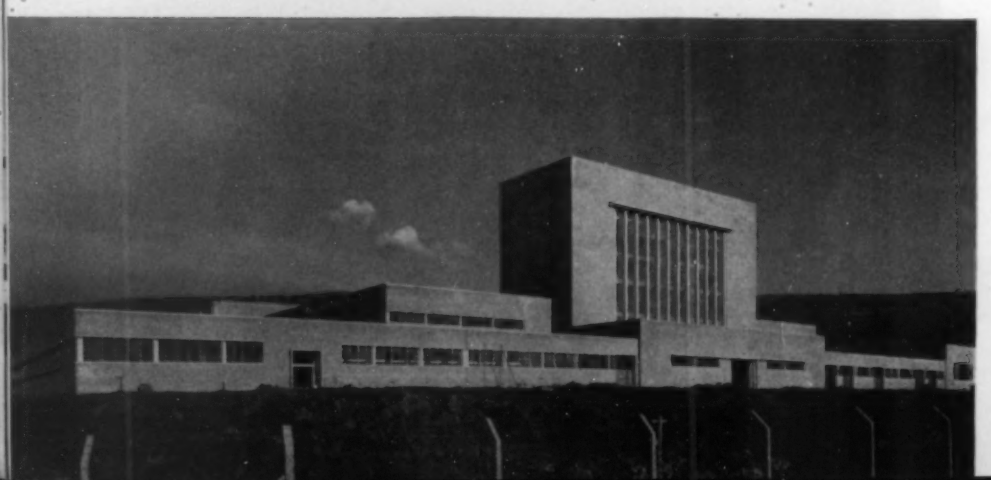
Another feature is the application of scientifically-designed lighting. One result of the blacked-out factories in World War II has been a very close study of daylighting, much of it undertaken towards the end of the war by government's Building Research Station. It has been claimed that the knowledge and ideas of Britain's experts on this subject are in advance of current American practice, and that British architects have now improved on the "monitor" roof light which used to be so popular in American factory building.

The windowless factories, of which several examples have been built in the United States, are not favored by British architects; wartime experience had shown that workers dislike them and that output was adversely affected. Opinion generally favors a combination of artificial illumination and daylight, so as to maintain a high, even standard of lighting everywhere and yet allow workers some view of trees and sky. This gives the illusion of a daylighted factory, the addition of artificial light being almost unnoticed. On the other hand, the "all-glass" factory is equally disliked because it has poor insulation, being cold in winter and like a hothouse in summer, and often resulting in a glare that is uncomfortable or even dangerous to workers at machines.

The word "welfare" has taken on a greatly extended meaning. It denotes much more than the provision of a canteen, a first-aid room or sports ground, though today these are considered to be essential. It implies the creation of a good working environment, the result of a close study of the ways of achieving the physical well-being and morale of workers as individuals. Careful consideration is being given to the color of both factory interiors and machines, linked with the application of lighting to different classes of work. New methods and color schemes introduced have resulted in a better morale in the factory, fewer accidents and improved output.

The progressive influence of good design and color is well illustrated in the coal mining industry. Very early in the inter-war period the Miners' Welfare Commission began to erect pit-head baths. The architects in charge insisted on making them colorful and designing them well. In all, 365 mines were provided with bath buildings. Their bright appearance influenced the layout and other secondary buildings of mines, and has now culminated in the complete architectural design of a new colliery at Rothes in Scotland. This new colliery, now under construction for the National Coal Board, houses the most modern lifting, handling and washing plant.

John Maltby Photo



New factory for British Nylon spinners at Pontypool, South Wales. Sir Percy Thomas and Son, architects; Messrs. Scott and Wilson, consulting engineers

IN ENGLAND

Wainwright Photo

Interior of generation station of the new steel rolling mill for Appleby Frodingham Steel Company. Frederick Gibberd, architect

Britain's new factory buildings reveal the accepted belief that industrial architecture is not a poor relation of the fine art of architecture as expressed in public buildings, but an integral part of it; that a factory of good shape, efficient planning and clean color is a work of architecture in its own right; that the function of having to produce something to sell at a competitive price is only one of the many limiting factors which govern building projects; that even heavy industry with its tradition of noise, dirt and fumes, need not create "blighted areas" as in the past. These concepts are generally accepted by industrialists as well as by architects, and are being accepted increasingly by public opinion in Britain.

Most of the facets of Britain's postwar factory building drive are illustrated in the great new factory of British Nylon Spinners Ltd.

This has been built at Pontypool in the South Wales mining area. It was designed by Sir Percy Thomas, a past-president of the Royal Institute of British Architects. The main building is 1084 ft. long and has a million sq. ft. of floor space. With full production 1700 men and 300 women will be employed in a continuous three-shift system. The site, which allows space for the factory to be doubled, has a sports ground for employees. Included in the scheme, though not yet built, are a head office building, a research block, an employees' club house and a games pavillion. The main building contains dining-rooms, a fully-equipped surgery and labor offices. In this last, the Works Council — a joint affair of directors, management and workers — and the welfare officers cooperate; an individual interest is taken in each employee and in the care of his or her welfare and health. Boys who enter the laboratories and young clerical workers are given facilities for part-time further education. The establishment of this plant by private enterprise was given assistance and encouragement by the Government.

An example of a middle-sized plant is that for Hoover Washing Machines at Pentrebach in Wales. Situated in a development area and now in production, the factory employs local labor, only three per cent of key personnel having been moved from the firm's London plant. The factory has a large sports ground with two football pitches, a running track, tennis courts and a bowling green. The canteen is situated between the factory and the sports ground and is designed as a club, the main hall having a stage. The building is a simple brick structure with a steel frame, but with its flower-beds, grass and young trees is in sharp contrast to the original site, which consisted of abandoned mine workings. This plant brings new employment, life and amenity to an old, declining industrial area.

The construction of a new factory is not yet as speedy as it would have been before World War II. Negotiations with Government departments take time; there is still a serious shortage of many building materials while there is an inflated demand for them, which the building licensing authorities have to sort out. Building labor is also short in many areas and its productivity not up to prewar standards. Work is still occasionally held up by delay in delivery of essential components. But these hindrances and frustrations are gradually being overcome. Britain is slowly, but steadily, progressing with her postwar reconstruction of industrial plants.

Wakefields Ltd. Photo.

Postwar factory in Britain for Hoover (Washing Machine) Ltd., also in South Wales. Wallis, Filber & Partners, architects. Features good facilities for workers

Great Lakes Spring Corporation plant has office and engineering departments in a second story portion, with cafeteria below. In the plant daylighting is brought to the interior with an A-frame monitor

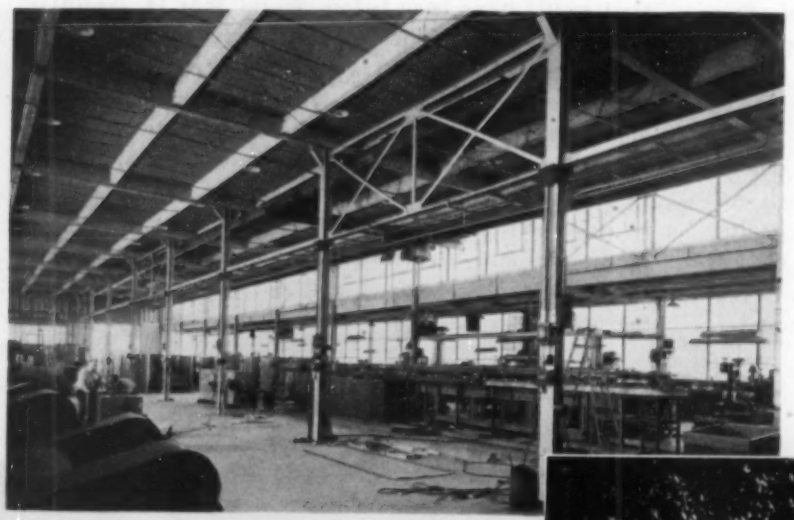
Hedrich-Blessing Photos

Recent additions to

Clearing Industrial District

Chicago, Illinois

FOUR TYPICAL SMALL FACTORY BUILDINGS



John S. Cromelin

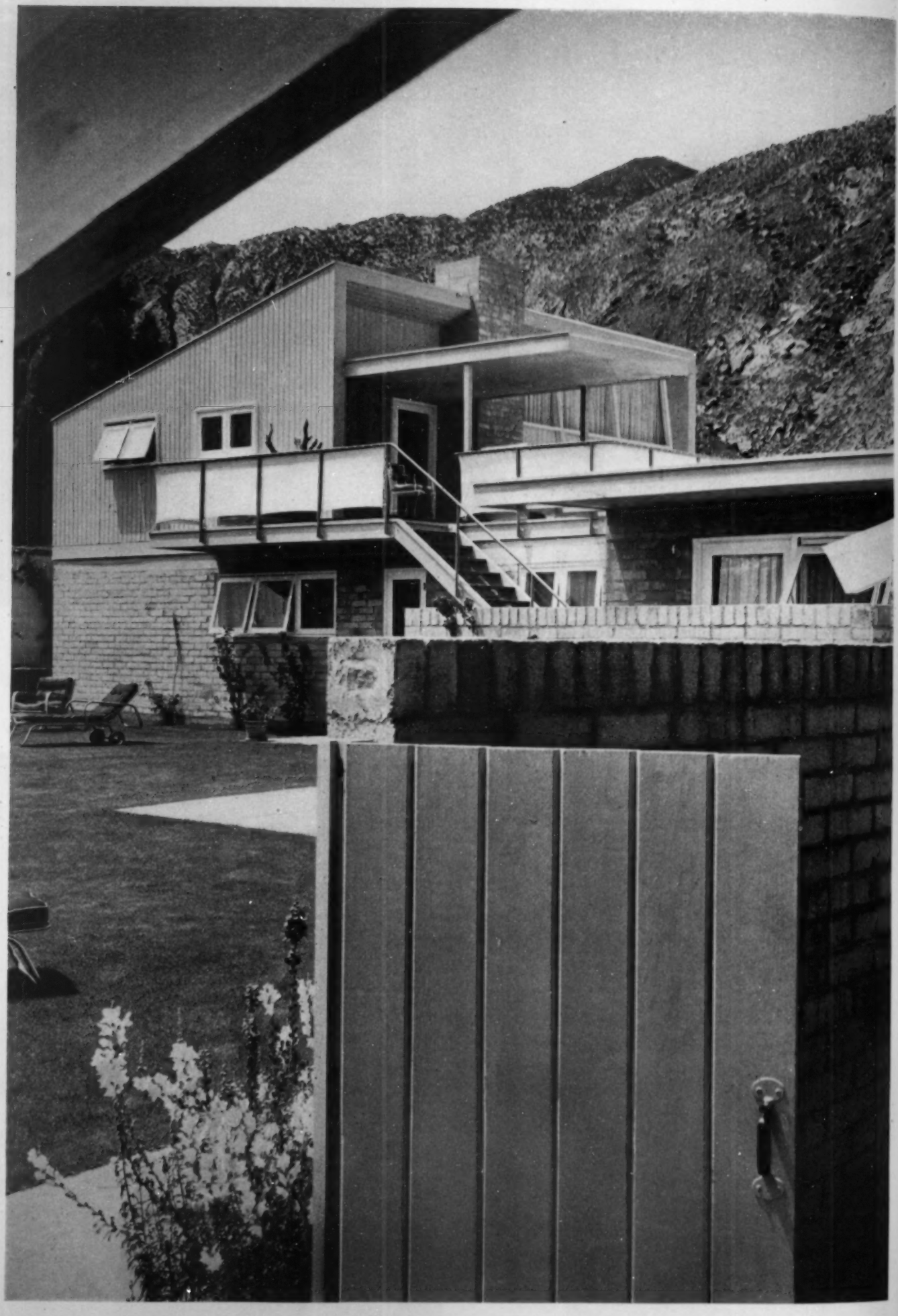
Architect

Crown Rheostat and Supply Company manufactures automatic plating equipment in its new plant. Steel construction which carries two 5-ton cranes. Exterior in salmon face brick, cast granite entrance

In general the plant of Acme-Wiley Corporation, manufacturers of neon signs, is typical of the Clearing construction, with its steel frame and monitor, though spans are longer than usual

THE small factory building is nowhere better typified than in the Clearing Industrial District, on the south side of Chicago. This factory subdivision has witnessed a steady building program in recent years, and John S. Cromelin, the staff architect, reports a recent increase in interest in new plants. This straw in the wind might indicate that factory construction will stay active, to confound prognosticators who have been saying that it will tend to decrease, what with postwar production in many lines catching up with long unsatisfied demands. Invariably the plants in this busy industrial area are unspectacular, but clean, straightforward, efficient and economical. Main production areas are all of one-story design, with large window areas.

National Can Corporation plant is larger than most in the Clearing District, containing 240,000 sq. ft. Factory section consists of alternate 61-ft. monitors and 21-ft. low bays



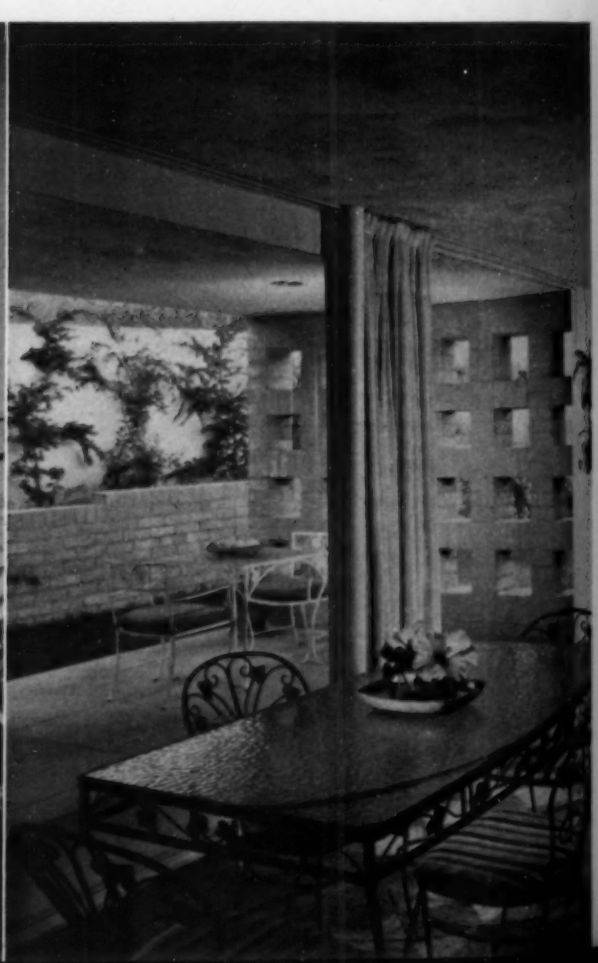
Julius Shulman Photos

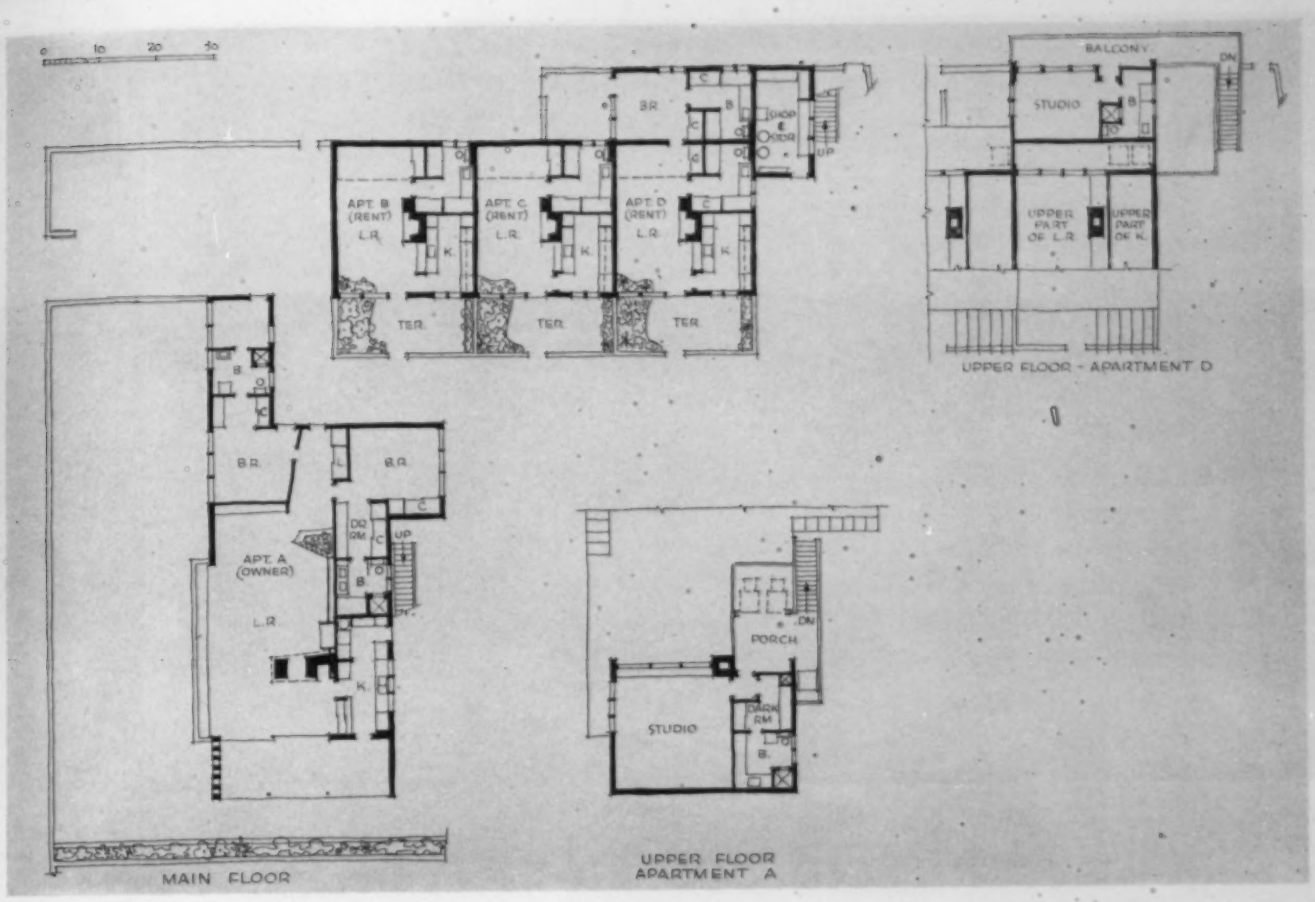
"THE COLONY": A STUDIO APARTMENT GROUP

BEAUTIFULLY situated at the foot of the San Jacinto mountains, this small group of studio apartments is keyed to the needs and preferences of a specific class of tenant — artists who spend part of the year in Palm Springs. The idea was that of illustrator Earl Cordrey, the owner, who gave his architects a detailed list of requirements (see next page). The building is concrete block and frame, with prominent studio roofs proclaiming its function.

Mr. Cordrey's requirements were specific: for his own apartment, living-dining space, two bedrooms (each with dressing room and bath), kitchen-laundry, office space, a studio large enough for classes, a dark room; for the other apartments, a private patio for each, and a small working studio among them; for the group, an informal atmosphere and a central garden with a pool. Exterior colors were chosen to blend with desert brush and surrounding mountains: lower walls are lavender gray with accent walls of deep eggplant; upper studios are soft gray, windows and doors are white. On the interior the concrete block walls and the ceilings are warm gray, with one wall in a deep grayed blue, green or purple. All cabinet work is natural oak, glazed with white. Floors are concrete, colored with acid stain and covered with matting in living rooms, asphalt tile in studios. Furniture includes Eames and Aalto chairs and pieces designed especially by the architects. Right: patios of the small units open to the central garden. Below and opposite: the owners' patio and dining terrace

Julius Shulman Photos

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K.
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MAIN FLOOR
BALCONY
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STUDIO
B.
UPPER PART OF L.R.
UPPER PART OF K.
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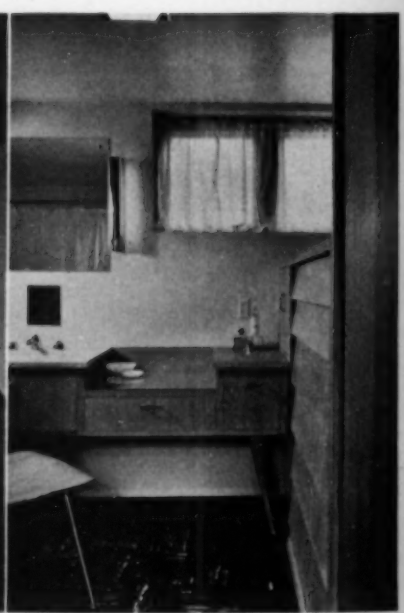
Julius Shulman Photos



Each of the small apartments has a large studio living room (above), dressing room (far right), kitchen and bath, and one has a separate bedroom and second bath. Plans call for future addition of another three units, identical in plan with the group already built. Right: looking out from owners' kitchen toward patio. Opposite: the owners' living room. All fireplaces are of Arizona stone with sliding mesh fire screens. Drapes, bedspreads, etc., were selected and made by Mrs. Cordrey. Electric space heaters and evaporative coolers provide for the variations in Palm Springs climate; hot water heaters, kitchen ranges and refrigerators also are electric. Roof and second floor walls are insulated with aluminum

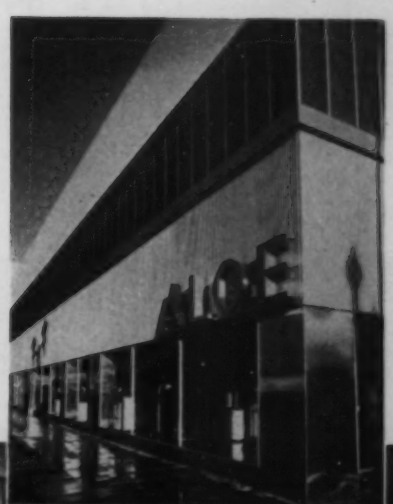
DESIGNED FOR DISPLAY OF HOSPITAL EQUIPMENT

A. S. Aloe Co., Los Angeles ***Richard J. Neutra, Architect***

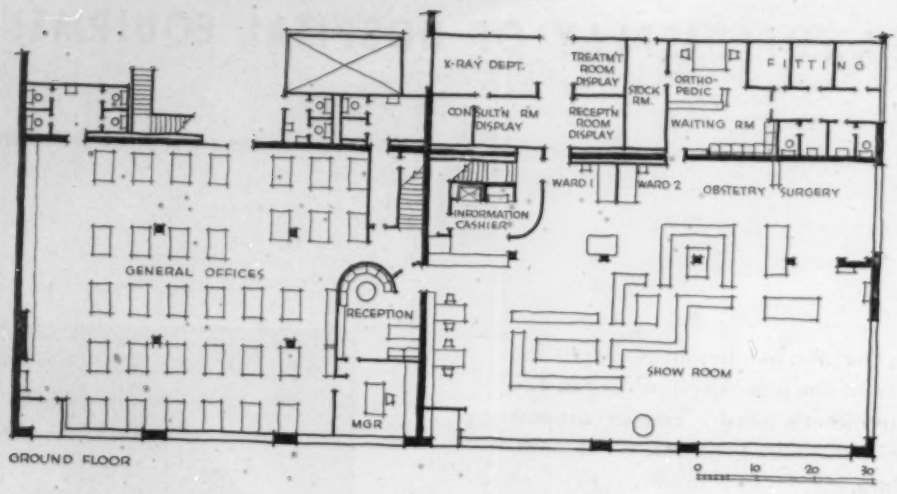
Julius Shulman Photos

ENTIRELY in keeping with the merchandise on display is the hospital-like atmosphere of the new Aloe building in Los Angeles, designed, in the architect's words, "not to compete with, but to form the proper background and foil for" laboratory appliances, surgery tables, etc.

Exterior of the two-story building is stucco with mica glaze, stainless steel and aluminum. Showrooms, a truss-fitting department, general offices, and handling and shipping facilities (not shown on plan) occupy the main floor, stock shelving and warehousing the second.

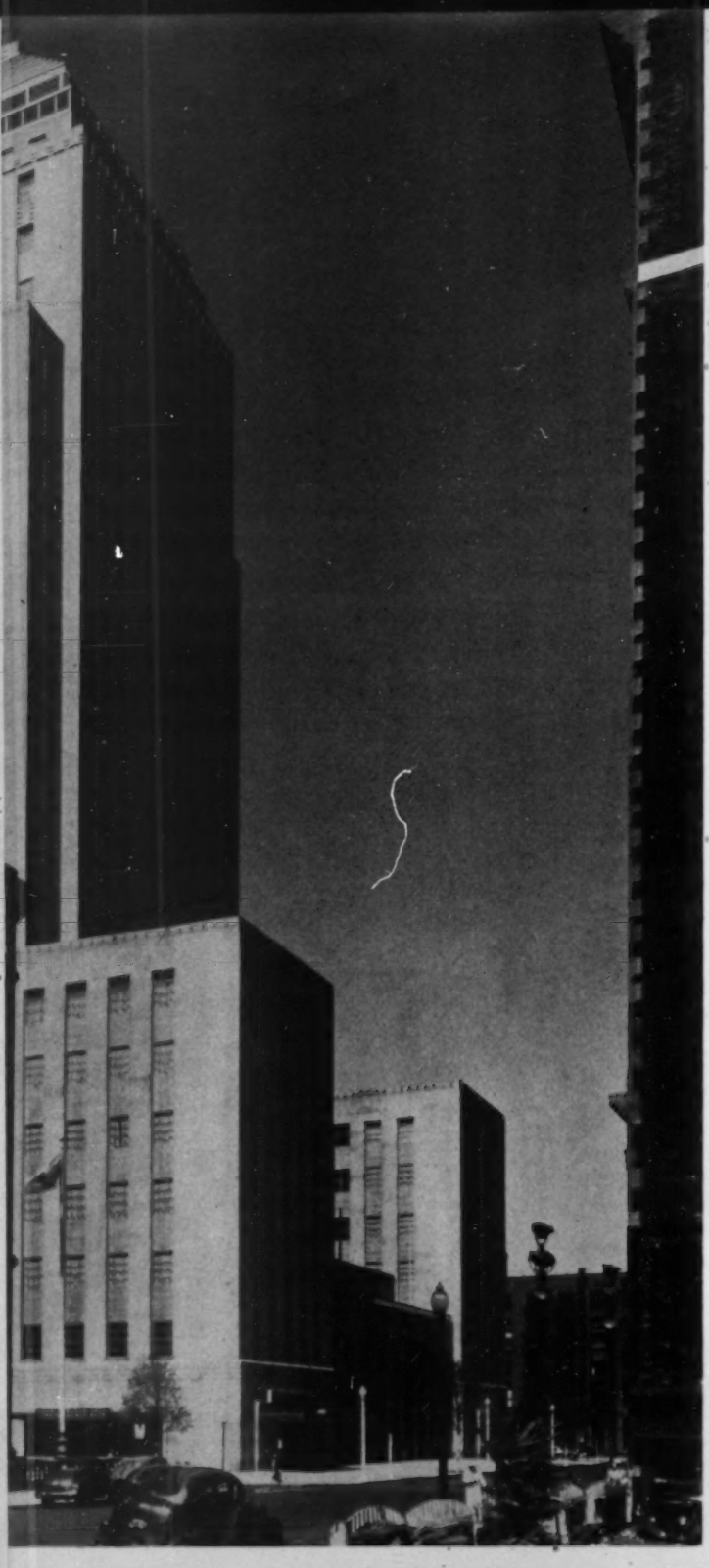


The large showroom, above and opposite, is actually one room, but is departmentalized by counter placement and stub partitions (see plan, next page). Walls are plywood veneer and laminated plastic, floor is black and gray asphalt tile, ceiling is acoustic tile



Julius Shulman Photos

Main touch of color in the showroom is a 60-ft. mural over the wall cases, designed by the architect and executed by Hans Mangelsdorff. It depicts, says Mr. Neutra, "the sub-tropical hospital overlooking a bay of the blue-green ocean and a shore of palms and luxurious Henry Rousseau vegetation." Significance is the interest of the Aloe Company in the development of health facilities in the Pacific area. Glass-fronted wall cases are lighted from bottom and ceiling; floor cases have glass tops, indexed drawers



John Hancock Mutual Life Insurance Company

HOME OFFICE
BOSTON, MASSACHUSETTS

Cram & Fergerson, Architects-Engineers

Turner Construction Co., General Contractor

Information desk and waiting room, main floor

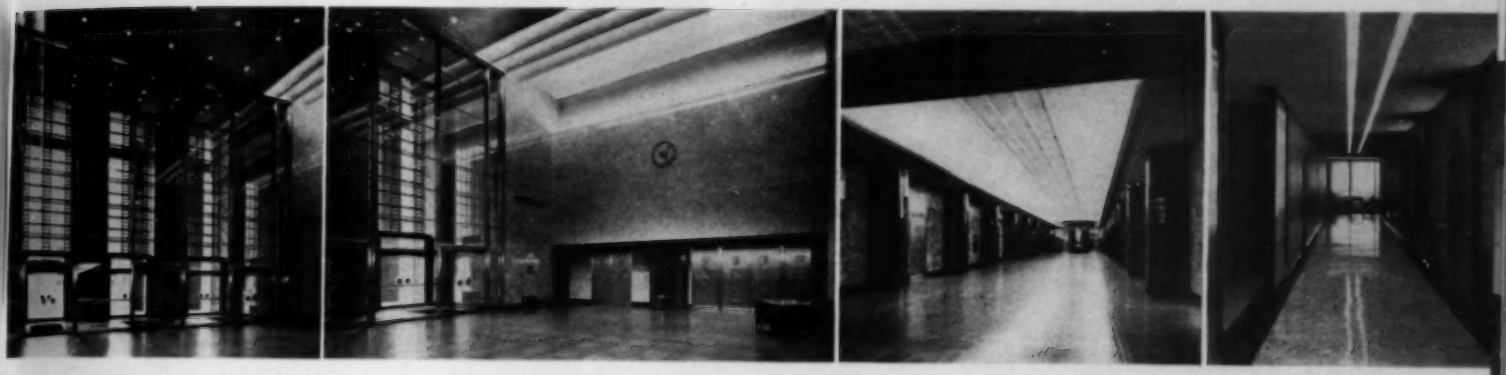
Extensive employees' lounge; employees' store is on same floor

John Hancock Hall, a complete theater, Boston's finest

JUST dedicated, Boston's newest big building dwarfs the adjoining former John Hancock home office. It is New England's tallest; mechanically it is completely equipped, in finish it is most meticulous, structurally it was a difficult problem. To quote *Newsweek*, "It does for Boston just what the Empire State Building does for New York."

Beneath it is a waterproofed concrete slab 10 ft. thick (to resist water pressure and distribute the load) on steel H piles driven 155 ft. below grade to bedrock. The building was designed and erected with care lest its weight should disturb the fill in which it sits, or displace surrounding structures. Above, it is occupied primarily by John Hancock, with 5 floors of rental space. In the building are: John Hancock Hall, Boston's most modernly equipped theater; the Dorothy Quincy Suite, for social functions; New England's fastest elevators (800 fpm); moving stairs connecting eight floors; an electric-eye-controlled mail conveyor system; eating facilities for 5000 employees; air conditioning for the entire building; and to top off, a stainless steel tower and TV-FM broadcast mast (the broadcasting station concerned has not yet received a TV license). All ceilings are acoustic. The aluminum sash can be cleaned from inside. Throughout, full performance, easy maintenance, etc., were paid at least as much attention as low first costs.

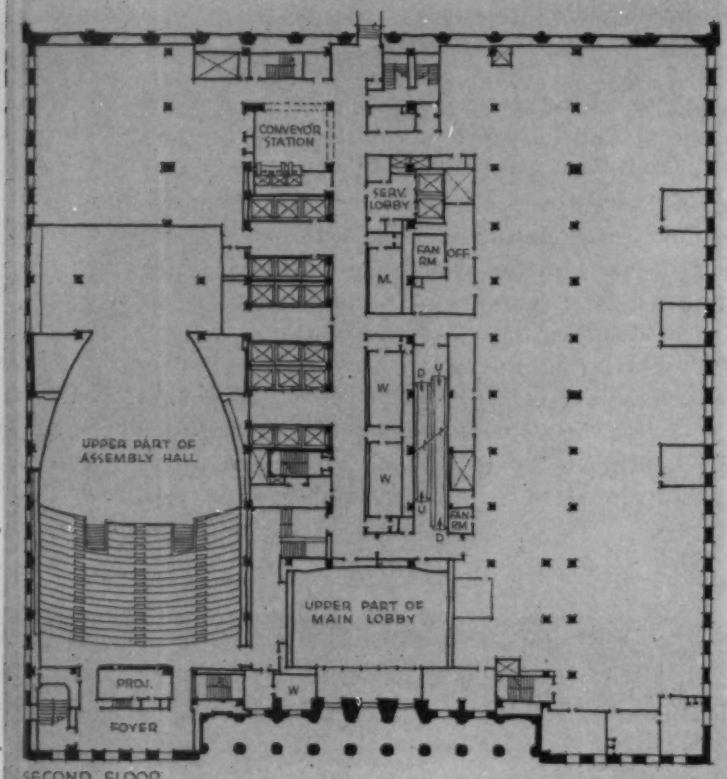
Photos by George M. Cushing, Jr., and Haskell



Street entrance; doors to John Hancock Hall and Dorothy Quincy Suite; elevator lobby; 6th floor corridor to executives' dining

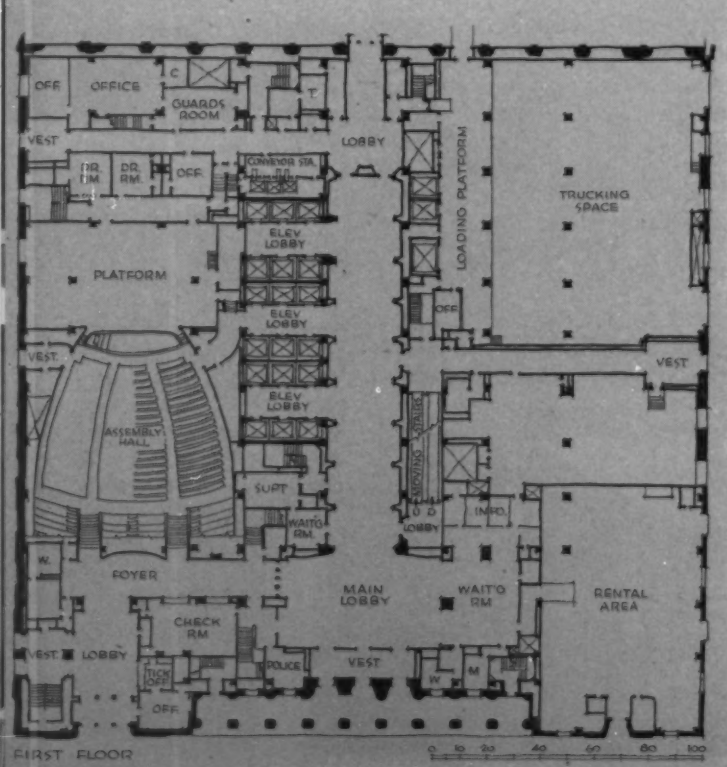
Above, lounge; at right, officers' and directors' suite

Conference room; right, lobby mural of Constitution drafting

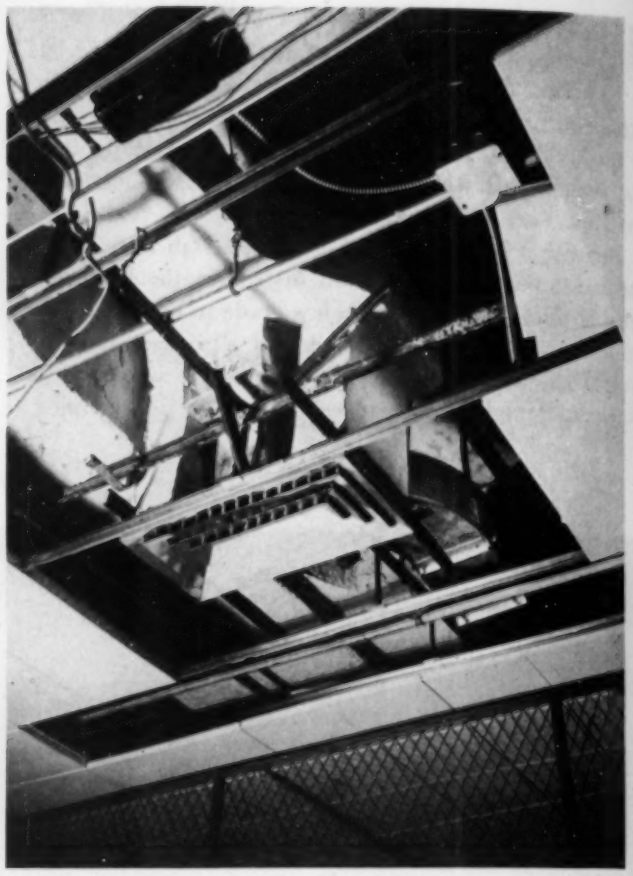


SECOND FLOOR

Ease of maintenance is stressed all through the building. Marble surfaces walls in main lobby, John Hancock Hall foyers and stairs to Dorothy Quincy Suite below it. Corridors have terrazzo floor and either tiled wainscoting or enameled metal walls. Stairways are tile walled, with terrazzo treads and metal handrails. In lavatories and toilets, no partition or fixture touches the floor (for easy mopping). These rooms and all equipment closets are lined with glazed tile



FIRST FLOOR



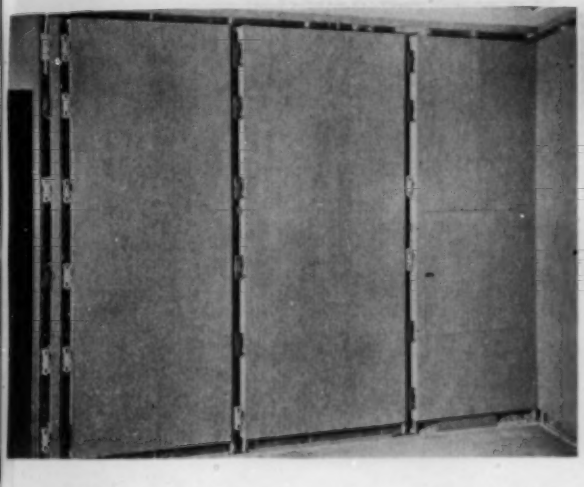
Acoustic ceilings, furred 3 ft., conceal ducts, conduits, etc.

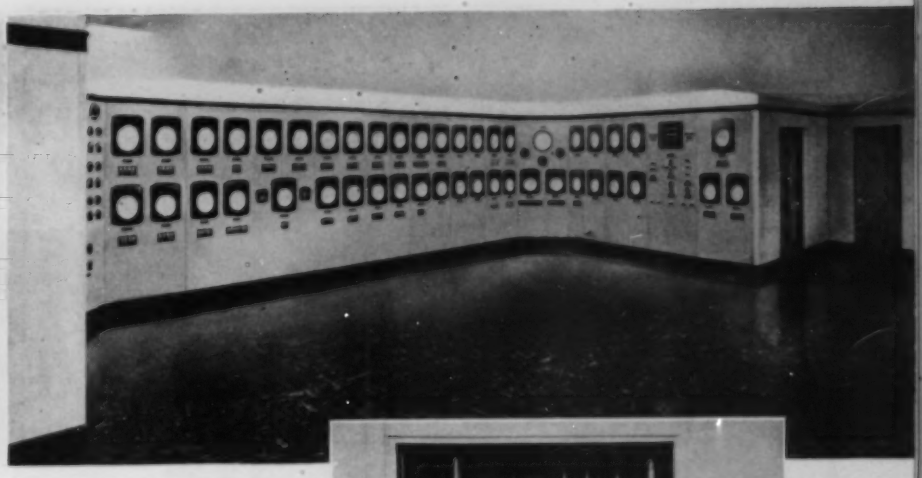
John Hancock Mutual Life Insurance Company

Air conditioning system **has electronic filters. Winter heating is provided by window heating units, steam convectors, some radiant heat. Steam from street service is reduced in pressure and distributed to the various systems, including kitchens and domestic water heating. There are some 65 air conditioning, exhaust and ventilation systems. Five vertical air conditioning zones are further divided according to occupancy and exposure into a total of 16 zones, for which units are grouped in sub-basement, 15th (mechanical equipment) floor and 27th floor. Air supply for cooling towers in the roof comes from louvers in the building wall. Temperature regulation is pneumatic, operated by locked pre-set controls in open office space, or manually set in private offices. Duct system required 477 tons of sheet metal; use of aluminum saved an estimated 372 tons. Supply and exposed return air ducts are cork insulated, covered with magnesia cement. Kitchen exhaust, extended to the roof in masonry shafts for fire protection, is of 11-ga. steel insulated with magnesia blocks.**

Spaces around the building's perimeter have supply units under each window, with thermostatically controlled dampers and steam heating coils; these are supplied by ducts on the furred ceilings below each

Office space provides excellent working conditions, can be easily rearranged. Right, pneumatic controls regulate air supply



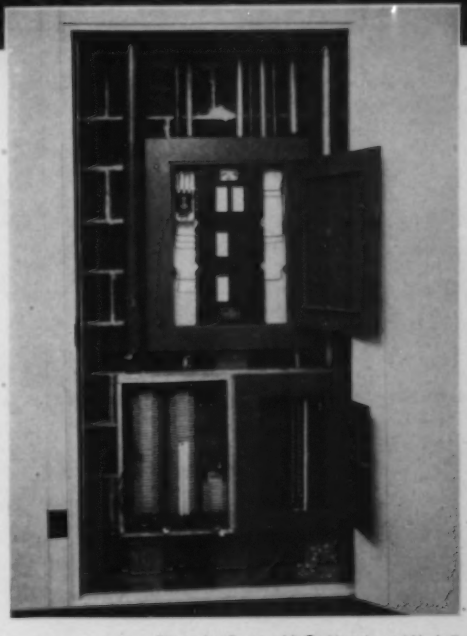


Special wood-surfaced partitions; right, 17-panel master control, basement

floor. Return grilles are also along exterior walls. Interior spaces are served by supply-return ceiling diffusers from ducts above. First floor entrance lobbies and trucking area use hot water radiant heat to dry wetness from street traffic. Sidewalks on three sides have hot water coils for snow melting.

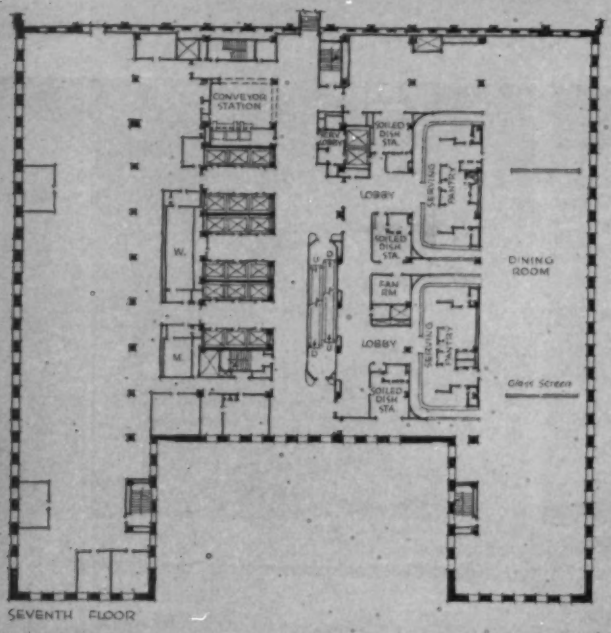
Electrical and lighting system. Wiring for 115-v, low-voltage, and two telephone systems is carried in the cellular steel structural floors and crossheader ducts. Frequent outlets in the asphalt tile floors give wide flexibility, as does the general use of movable, enamel-finished metal partitions and wainscoting. Paint and fabric colors were selected to reduce eyestrain. There are both outside and interior telephones (a 556-instrument outside telephone service, interior telephone system with a 1200-line board and 1480 instruments) and a program bell system. 21,000 flush fluorescent lighting fixtures with egg crate louvers are set in the 600,000 sq. ft. of suspended acoustic metal pan ceilings. Lighting is designed for 45 foot candles at desk level.

Dining areas and kitchens totaling 60,300 sq. ft. are required to serve the 5000 employees in two hours; outside restaurants are inadequate in the building's

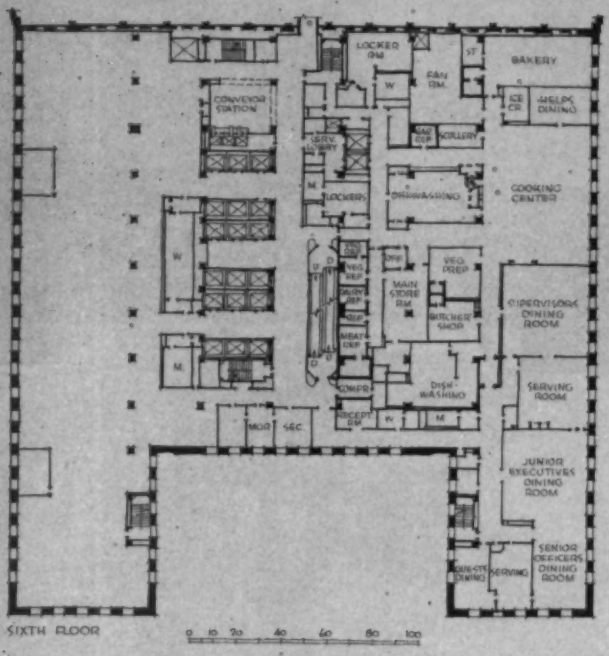


Photos by George M. Cushing, Jr. and Haskell

All services, including floor panel boards as shown above, are grouped around the central core. The 18 passenger elevators needed to get 5000 people to work simultaneously are electronically controlled. There are two electric stairways, both reversible to accommodate peak loads either up or down, from basement through 8th floor. Trucking space has three freight and service elevators, one running full building height

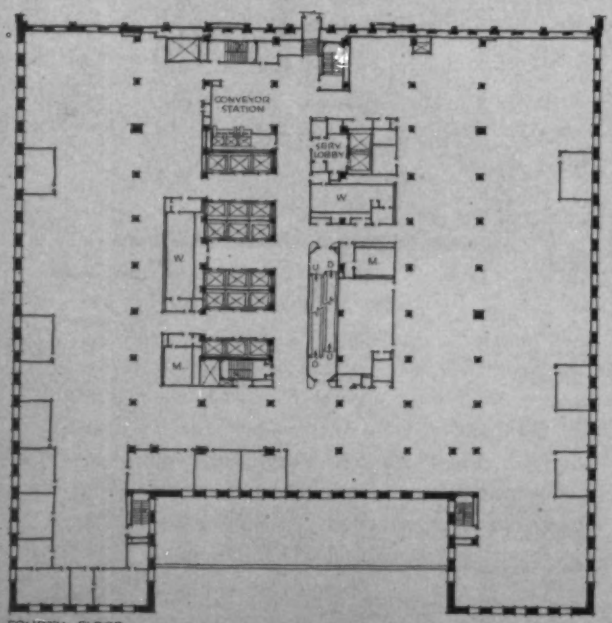


SEVENTH FLOOR



SIXTH FLOOR

0 10 20 40 60 80 100



FOURTH FLOOR

John Hancock Mutual Life Insurance Company

Huge cafeteria for employees feeds 5000 in 2 hours

Dining room for executives has its own serving room

vicinity, and the company sells meals for cost of food alone. The peach-tiled main kitchen on the 6th floor, with stainless steel equipment, includes a bakery, butcher shop, food preparation center, cooking facilities, walk-in refrigeration units, and two yellow-tiled dish-washing areas. Eight dumbwaiters distribute food to the four serving areas of the general 7th floor cafeteria. Dirty dishes are returned from three 7th floor stations by six conveyors. Quarry tile floors with drains, acoustic ceilings, and fluorescent lighting are used throughout the kitchens. On the NE corner of the 6th floor are two serving rooms and four wood paneled, carpeted dining rooms for supervisors, officers and guests. Off the 20th floor directors' room is another dining room

Left, clerks eat in air conditioned comfort; right, dirty dishes are washed in 2 dishwashing rooms on floor below

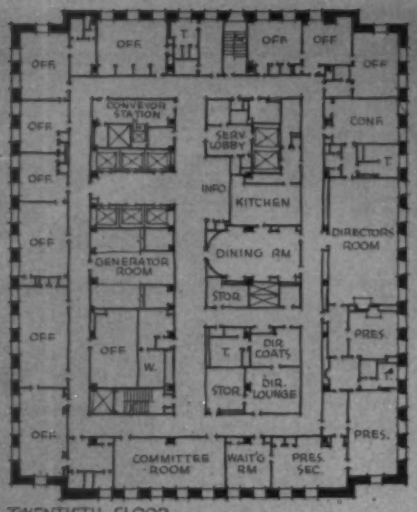
Above, dining room for supervisory personnel; right, main kitchen

and kitchen. A serving area for building service employees and supervisors is in the basement. The Dorothy Quincy Suite in the basement has its own caterer's kitchen.

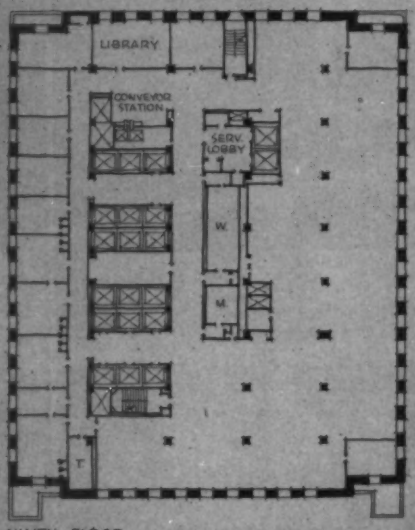
Mail distribution: to facilitate handling over 200,000 pieces of mail and inter-office correspondence daily, an automatic system of vertical and horizontal conveyors, extending from basement to 25th floor, is tied across to the old building with a moving conveyor from the basement to the 10th floor. An electric eye sorts mail trays between the two buildings. A spiral chute serves to backlog mail during rush hours. From the trucking space, two chutes deliver incoming mail to the basement receiving room.

Photos by George M. Cushing, Jr., and Haskell

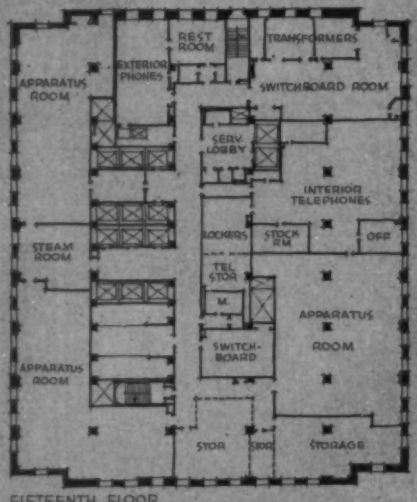
Detail, kitchen, hoods collect gases for exhaust to roof, have indirect lights, and carbon-dioxide fire-extinguishing system; quarry tile floor can be hosed



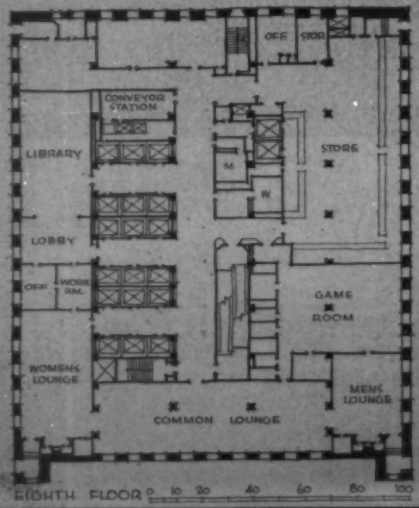
TWENTIETH FLOOR



NINTH FLOOR

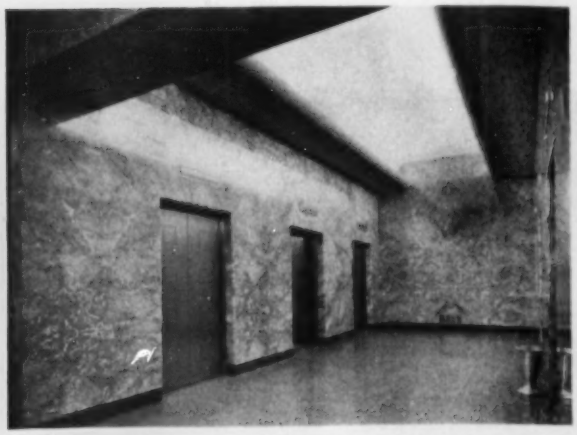


FIFTEENTH FLOOR

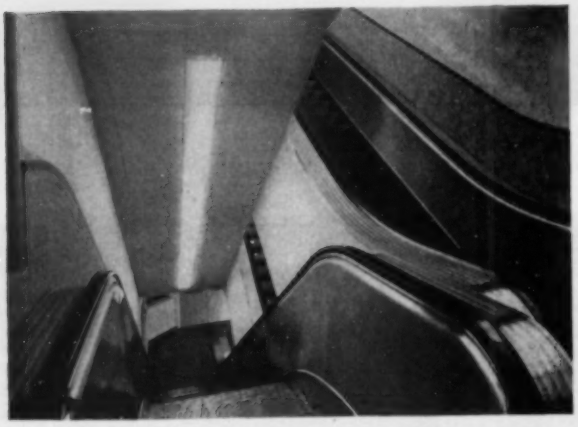


John Hancock
Mutual
Life Insurance Company

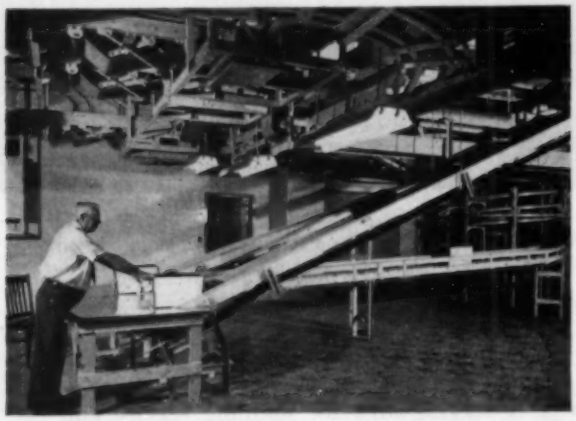
Photos by George M. Cushing, Jr., and Haskel



Main floor, lobby for one of the 3 elevator banks

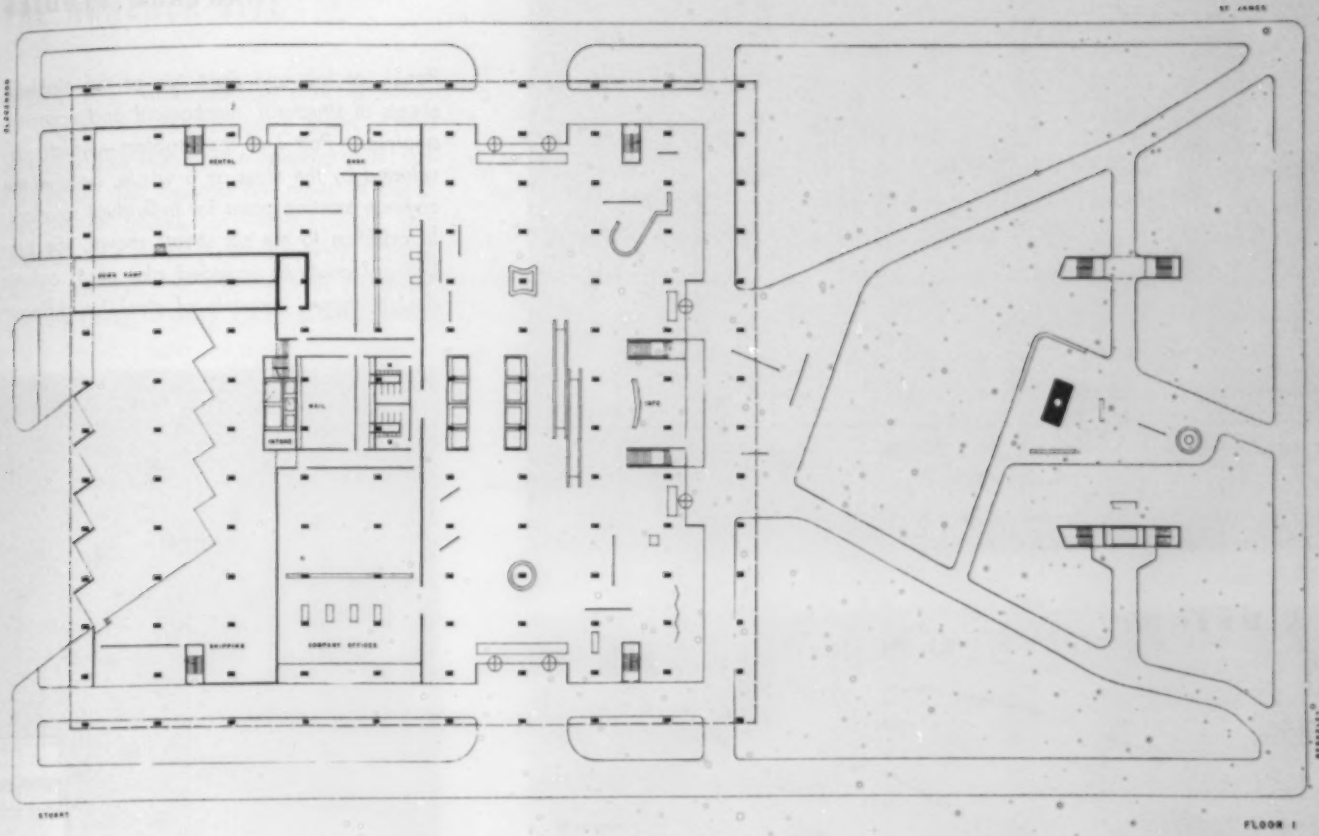


Reversible moving stairs, basement through 8th floor



Mail conveyor; at rush times mail trays "stack" in spiral, rear

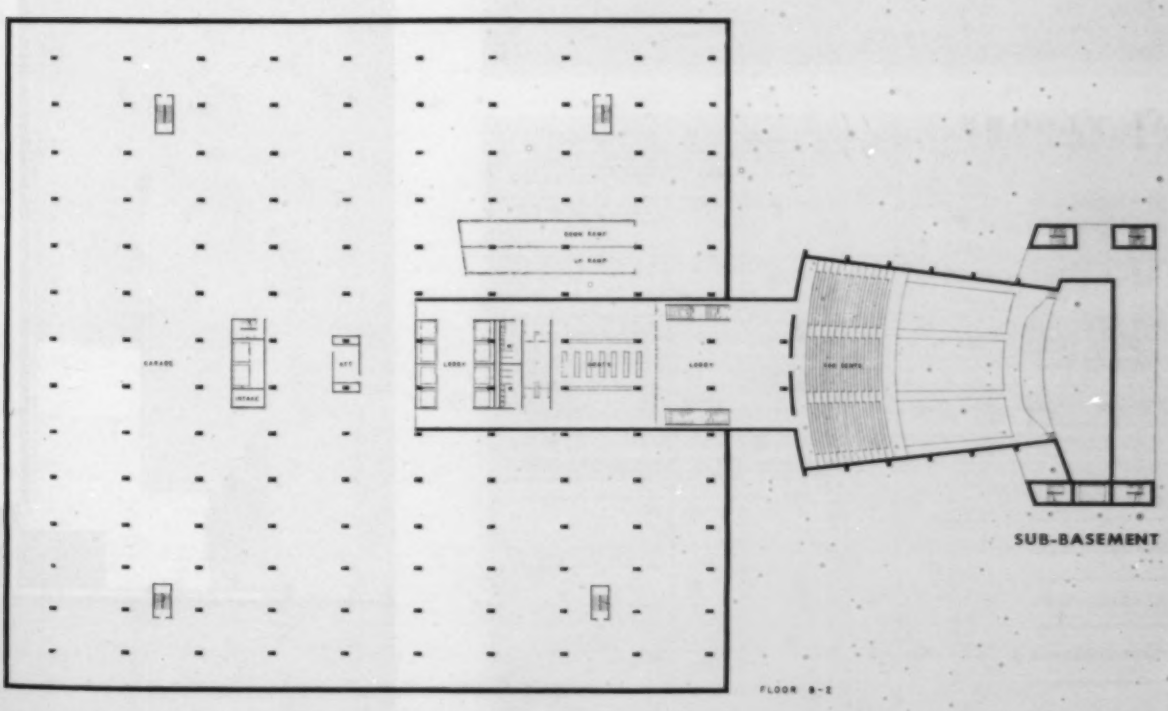
Typical toilet; ceramic tile, hung fixtures, acoustic ceiling



GROUND FLOOR

HARVARD PROBLEM BASED ON JOHN HANCOCK SITE

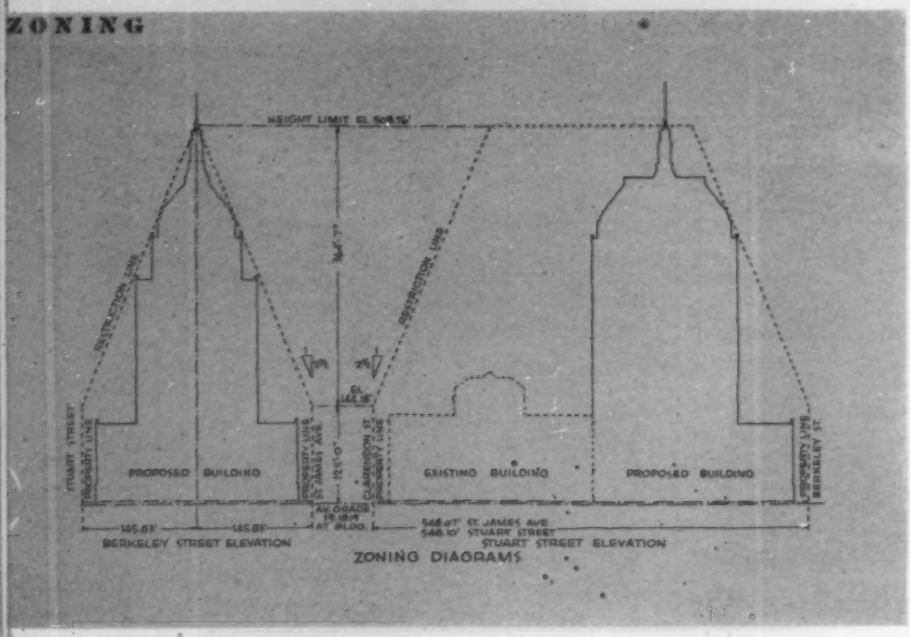
The program and the site of the actual John Hancock Building formed the basis of an architectural problem in the Graduate School of Design, Harvard University. The problem had two parts: first, structural, mechanical and economic analyses made by the entire class; second, individual solutions, of which one example, developed by Derks, Harvey, Graffunder and Ying, is shown here

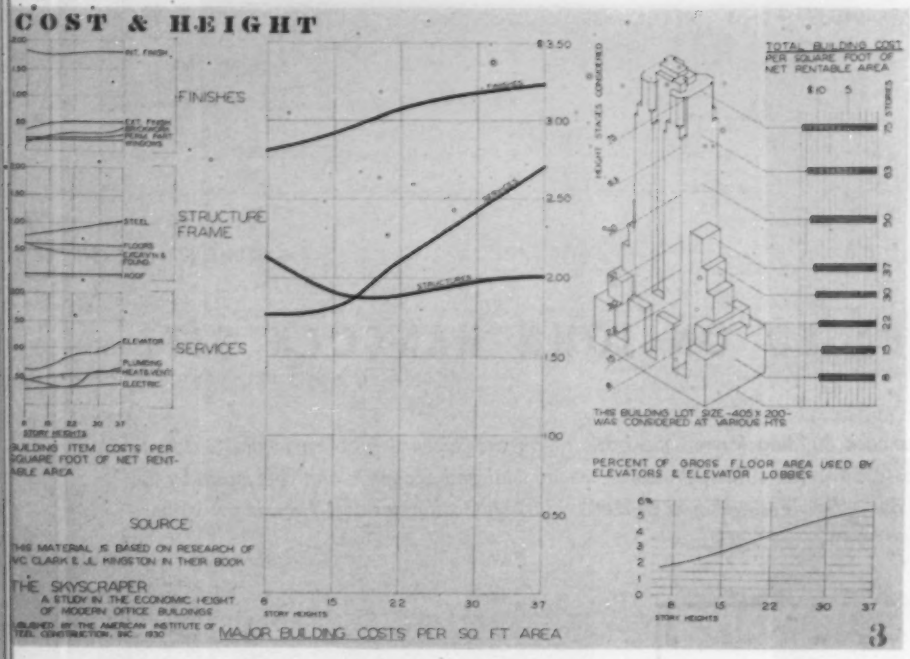


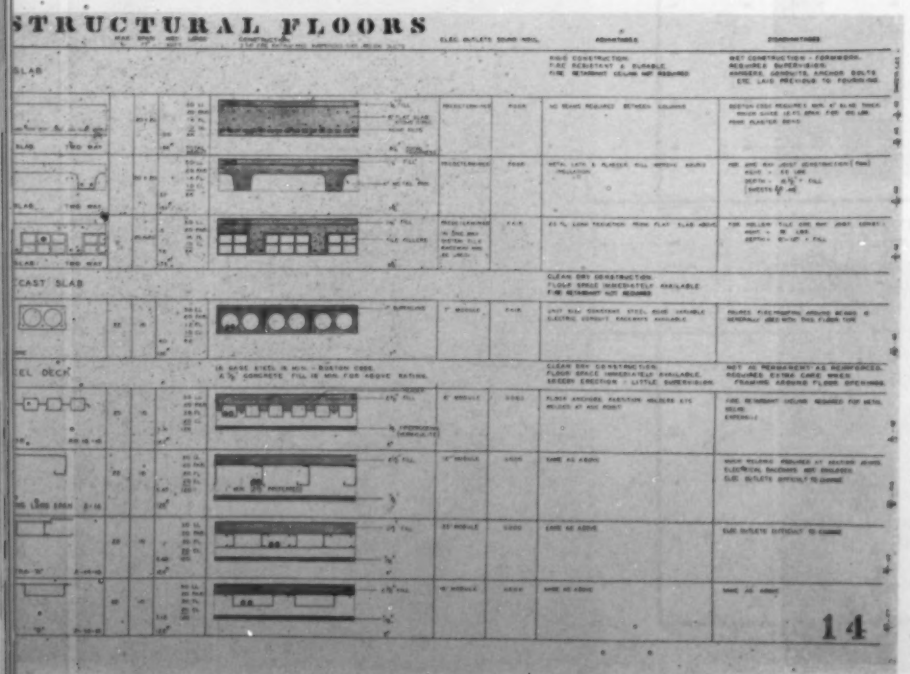
SUB-BASEMENT

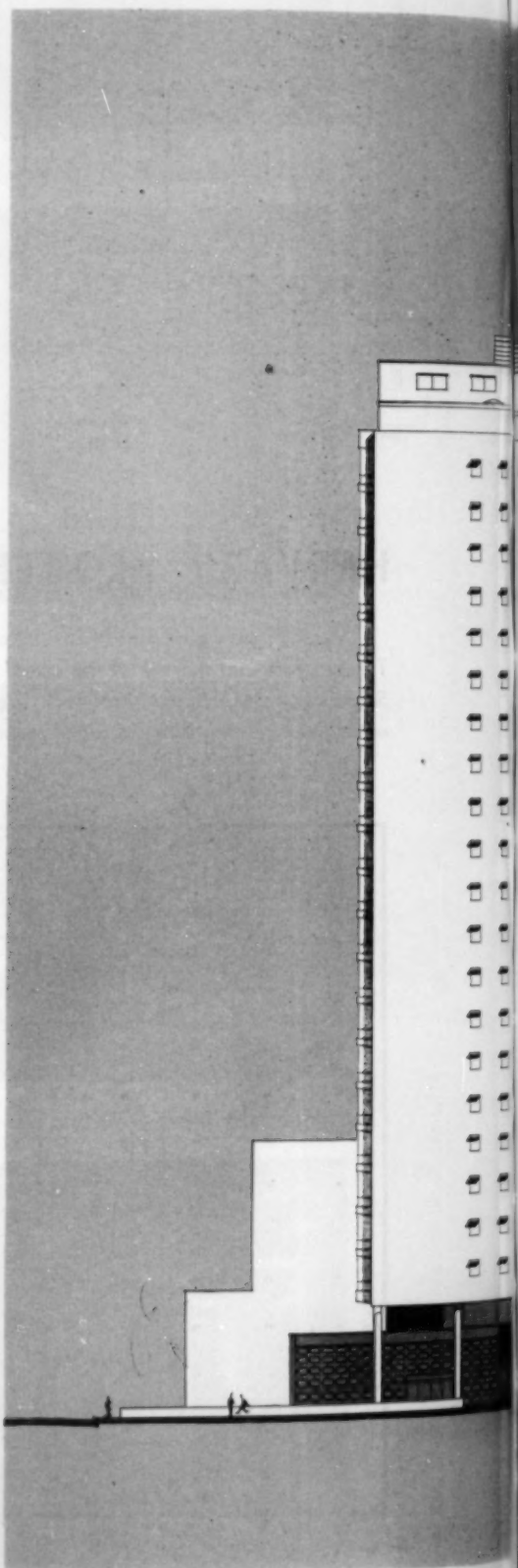
HARVARD STUDIES

Panels at left and right: six of the eighteen sheets of structural, mechanical and economic analyses — Part I of the problem — which, developed by the class as a whole, became the common starting point for individual solutions. In addition to the six sheets shown, the preliminary analyses included plot plan; column design (types; amounts of steel for different



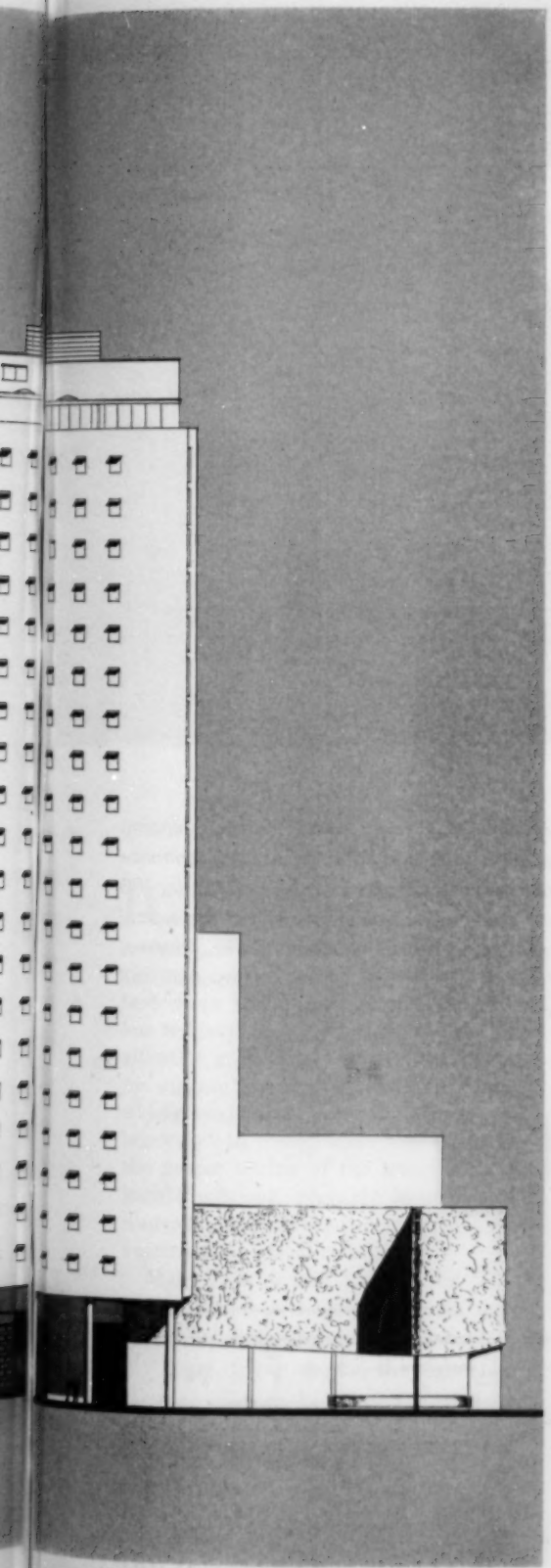

COST & HEIGHT
FINISHES
STRUCTURE FRAME
SERVICES
BUILDING ITEM COSTS PER SQUARE FOOT OF NET RENTABLE AREA
SOURCE
THE SKYSCRAPER
A STUDY IN THE ECONOMIC HEIGHT OF MODERN OFFICE BUILDINGS
MAJOR BUILDING COSTS PER SQ FT AREA
TOTAL BUILDING COST PER SQUARE FOOT OF NET RENTABLE AREA
THE BUILDING LOT SIZE -405 x 200- WAS CONSIDERED AT VARIOUS HTS
PERCENT OF GROSS FLOOR AREA USED BY ELEVATORS & ELEVATOR LOBBIES
3

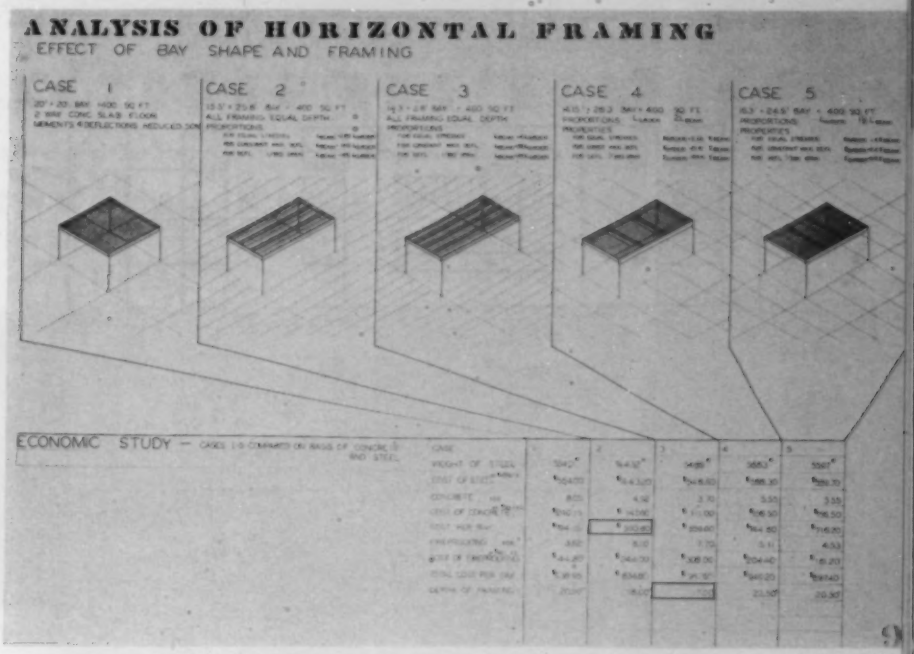


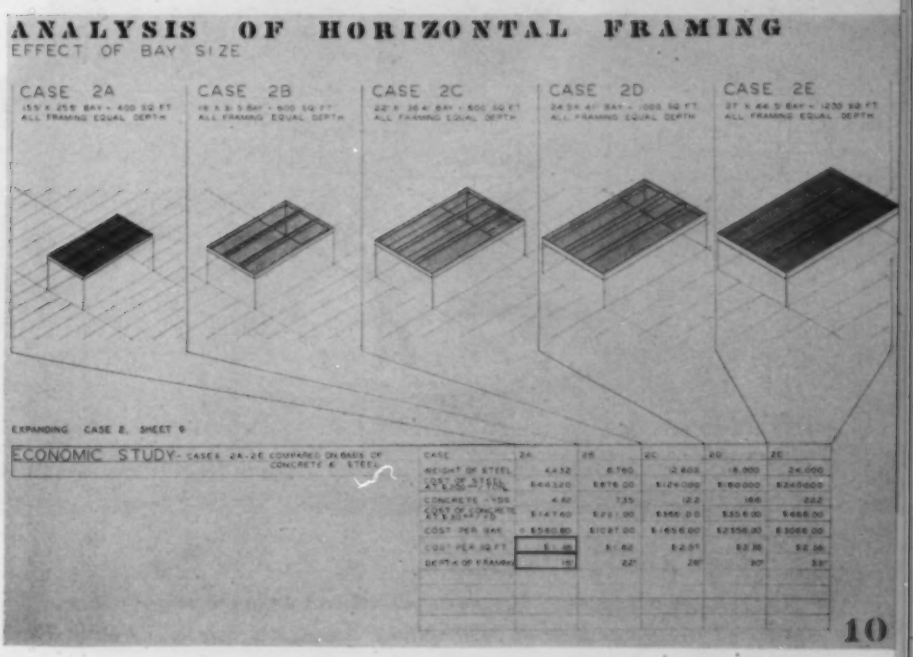


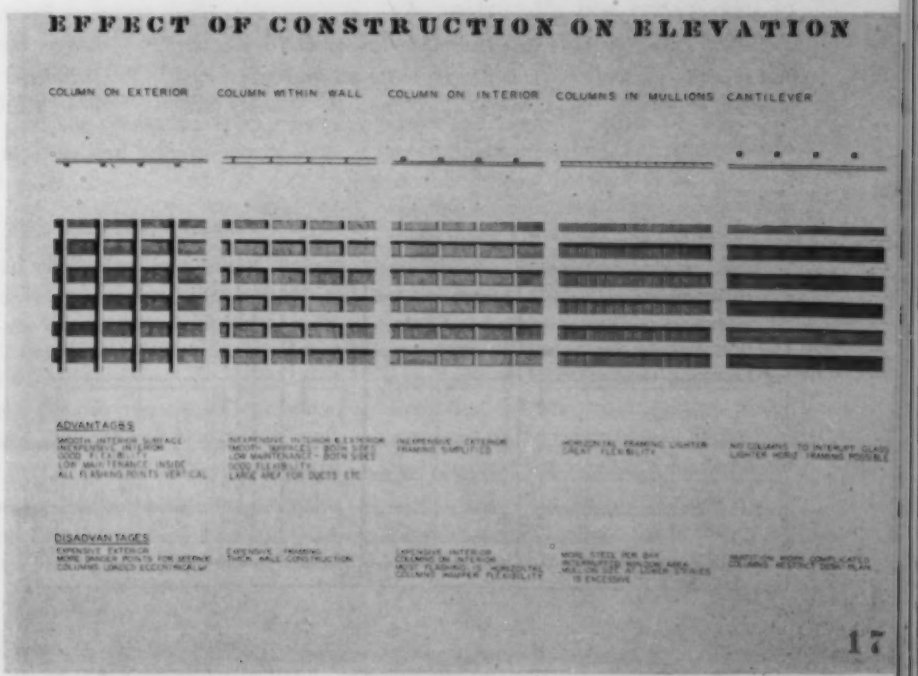
THE HANCOCK SITE

arrangements); wind bracing; effect of elevators and moving stairs on bays; effect of truck parking on bay size; Boston building code; cost differentials (for appropriate types of bays); analyses of beams, of exterior walls and columns; and a final cost summary. Center, below: elevation of scheme (Part II) developed by Derks, Harvey, Graffunder and Ying

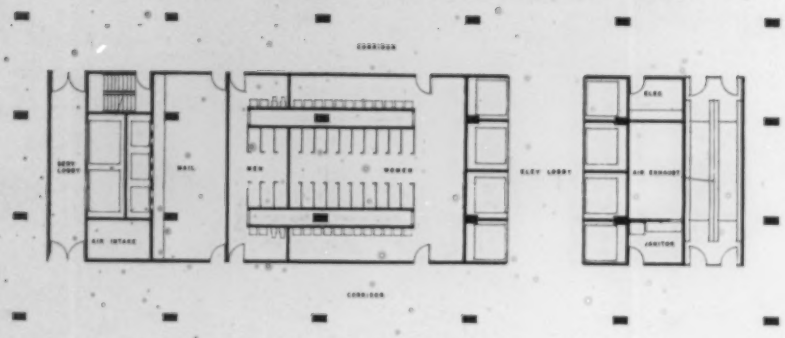




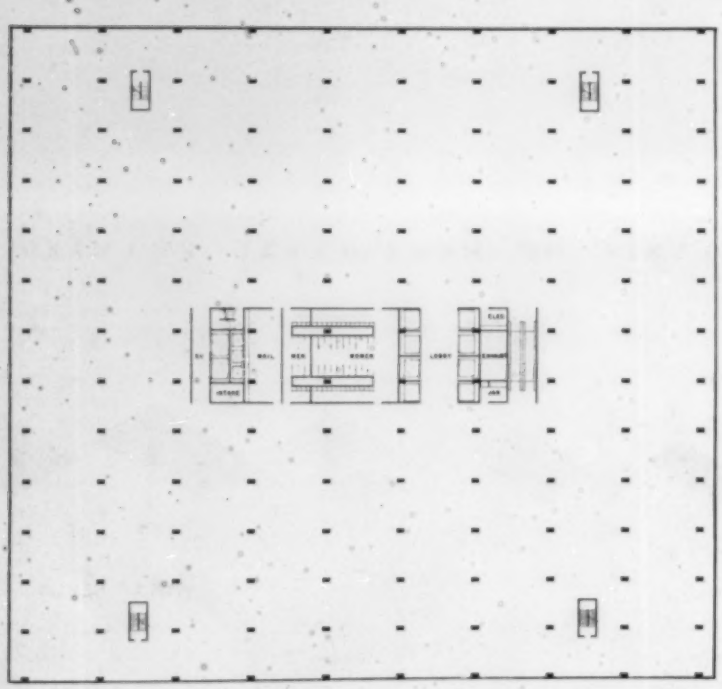




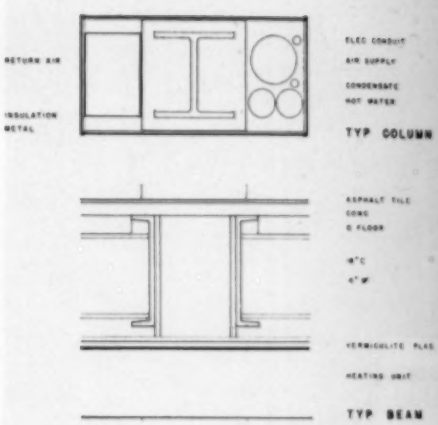
HARVARD STUDIES
THE HANCOCK SITE



SERVICE CORE

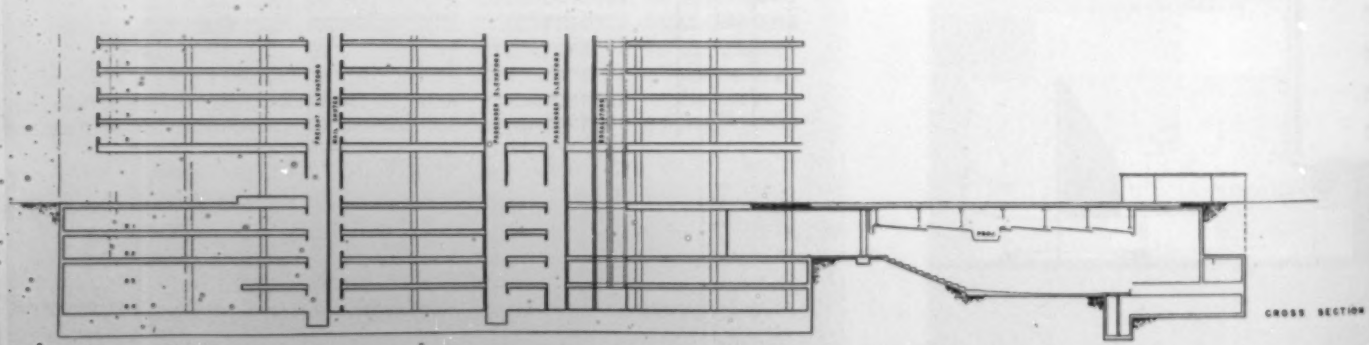


FLOORS 2 THRU 13



Above and left, service core, typical column with air and water services, and floor construction which are combined to form the typical floor

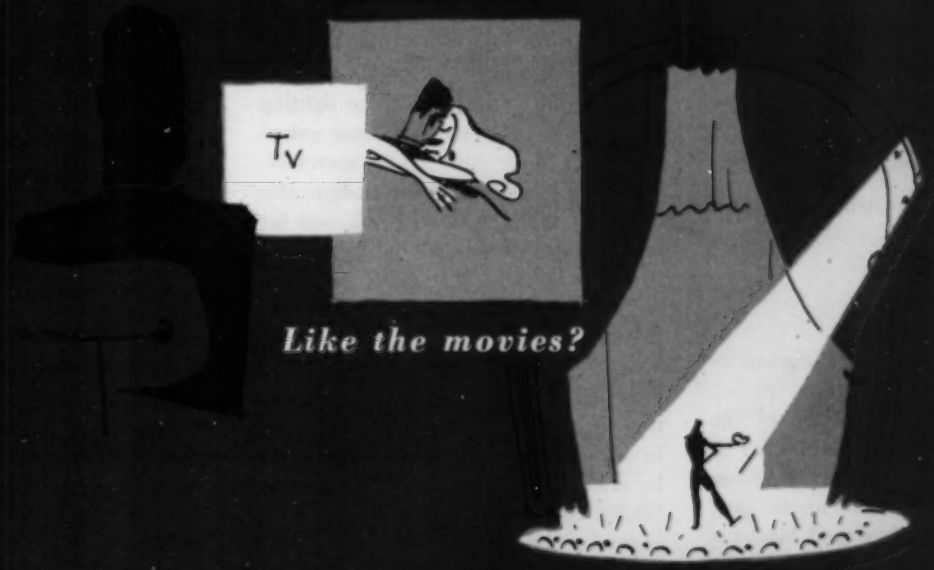
The Harvard requirements, like the actual Hancock program, envisioned a 26-story building with corridor connections only to the existing building; a completely air conditioned structure for 4000 to 6000 employees, with the maximum possible of office space, an assembly room (used also for dances and banquets) and separate auditorium, dining facilities for all employees, mail distribution system, three large classrooms for training programs, a recreation suite; and vault, dead storage, shipping and receiving (trucking), elevators and escalators, entrance lobby, and mechanical equipment spaces, plus parking for 100 cars. Below is shown part of the section which, like the typical details above, was developed by students Derks, Harvey, Graffunder and Ying. This was one of several solutions; all showed application of architectural imagination



CROSS SECTION

Drawing by Walker Cain

HOW DO YOU LIGHT A ROOM FOR TELEVISION?



By E. W. Commery*

HARDLY a day passes without some news about television — improved receivers, electronic vs. mechanical color systems, coaxial cables to connect distant cities. But one phase of TV which has received little, yet deserves much, attention is *the proper visual environment for viewing the telecast*. Although not widely recognized, room lighting is as important to comfortable viewing as is the proper tuning of the television set itself. Sufficient, properly located and controlled light is needed near the television set for visual comfort.

Many new owners look at the television picture in the dark because, first of all, they desire the psychological effect of "going to the show," they also feel they can see more by viewing the picture in the dark, and finally they have no distractions to bother them.

This is a mistake since television pictures, motion pictures and the theater each present distinctly different viewing conditions. The eye has to watch greatly different areas and brightnesses of light in each case.

How TV, Movies, Theater Differ

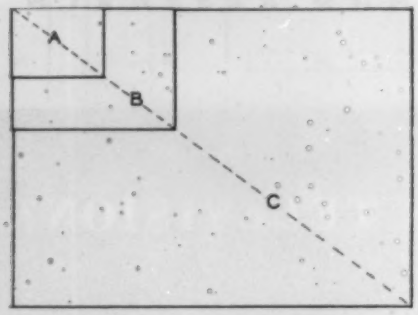
Visual discomfort in viewing motion pictures is avoided through large picture size and low screen brightness, even though the house lighting is carried at very low levels.

In the theater the size of the stage, its depth, its normal brightness level, which averages substantially above the motion picture screen, and its reasonable freedom from excessive brightness ratios, except for brief intervals, as well as the effect of the light from the stage reflected into the house all combine to provide visual comfort for the audience.

Not only is the television screen much brighter, when tuned to good stations and correctly adjusted, than the motion picture screen, but when viewed at the proper distance forms a much smaller image. Thus when a television set is viewed in a darkened room the eye has to remain fixed on a more concentrated source of bright light as compared with the motion picture.

We may properly ask why motion pictures are viewed in near-dark rooms, since that is the normal practice. Measurements of the brightness of all parts of the screen when viewing a high quality black and white motion picture reveal some surprising values to those not familiar with this art. For example, in a

* Engineering Division, Lamp Department, General Electric Co., Nela Park, Cleveland, Ohio.



Comparison of Screen Sizes

TELEVISION PICTURE
A—Viewing distance 10 times tube diameter

MOTION PICTURE
B—Rear of house. Viewing distance 6 times picture width
C—Front of house. Viewing distance 2½ times picture width

movie a white pillow case hung out in full sunshine may be produced at 5–7 footlamberts.† (The brightness of the moon is about 1000 footlamberts.) A beautiful scale of grays is provided from a few tenths footlambert up to one, and a scale of deep grays and blacks is presented at less than 0.1 footlambert and down to 0.01 footlambert. The thing to consider here is that the values just given are commonly used, and they do provide the desired sensation of light values from deep shadows to bright splashes. The dark house and the low brightness screen enable the viewers to see through the great range of the black end of the scale.

The blackest value with television begins around 0.2 to 0.3 footlamberts, *over ten times the working black range of motion pictures.* The marked difference in the brightness ranges of the television tube and motion picture screen are diagrammed at the bottom of this page.

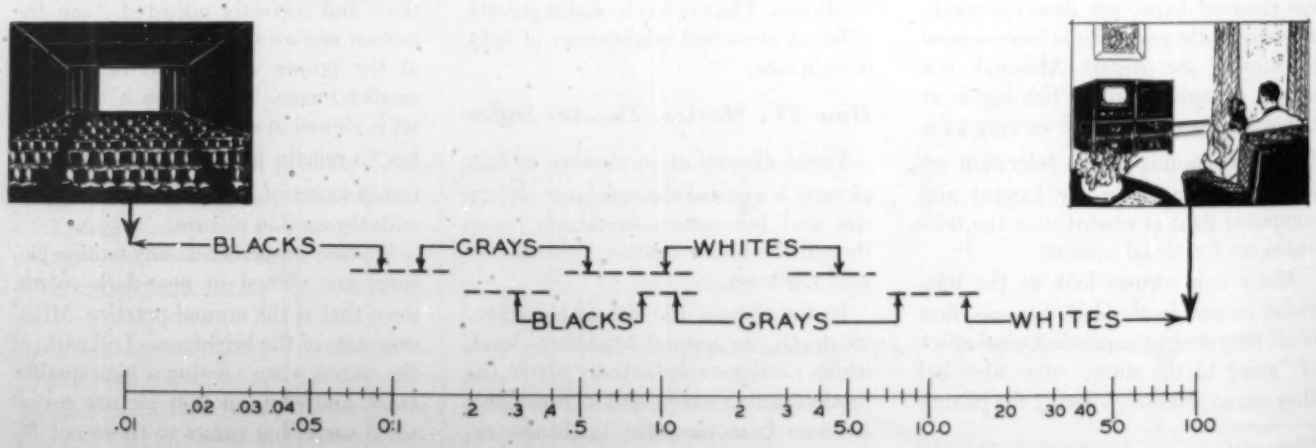
Since white values run from 15 to 50 footlamberts and up with television, we do not need to drop the room lighting way down as in the movies. These values look white in normally lighted surroundings. The black end of the scale is also relatively high, so there is no need for sensitivity to view a scale of black values which do not appear to exist.

The usual discomfort producing qualities of television pictures also may be visualized in still another and more direct way, and that is to view the picture for a period of five to ten minutes in an unlighted interior. Follow this by gradually increasing the background brightness against which the picture is viewed. (This experiment is easily done with a 60-watt lamp placed back of the receiver and moved away from the wall a foot or more so as to expand the background lighting pattern. With a variable resistance in the lamp circuit, the background brightness can be brought up to the average background brightness of the tube, or higher.) With the bright parts of the room background brought up to the background brightness of the tube, the comfort and general viewing sensations are reasonably satisfactory. Increasing the background above this point introduces discomfort since the pattern of light back of the receiver is not large enough. It needs help from added overall room lighting. That nothing is lost in the television picture under these lighting conditions is simply illustrated by switching the back lighting off or down in steps to off. Switching to off, of course, produces an annoying visual shock.

As noted before the television image is not only brighter than the motion picture screen, but also much smaller. In order to picture what a small image the eye has to fix itself on in watching television take the example of a 10-in. tube viewed at 8 ft., subtending an angle of about five degrees at the eye. This is not much larger visually than a three-cent postage stamp held 14 in. from the eye. A stamp mounted on a gray card held 14 in. away and viewed for 30 minutes will emphasize the fact that the television screen is something new in our visual experience. Parallels of this eye use may be found in industry. The mariner, and more recently, the airplane pilot must often use their eyes similarly, although under different surround conditions. At least this close visual attention to such a small visual field is not paralleled in the home.

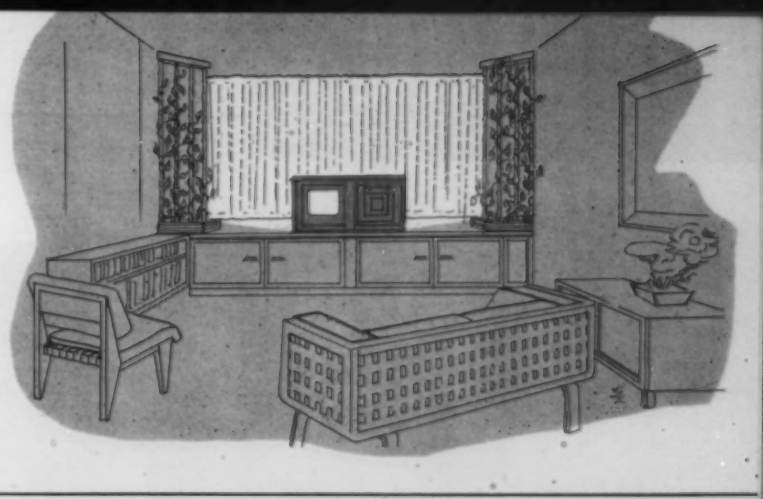
† *Footlambert—the brightness of a good white page in a book is about ¾ footlambert when illuminated by a candle held a foot away.*

The problem of lighting a room for television is different from that of the movie theater interior because the viewer must watch an image much smaller than the movie screen and about 10 times as bright. Drawings on this page contrast the sizes and brightnesses of the movies and TV



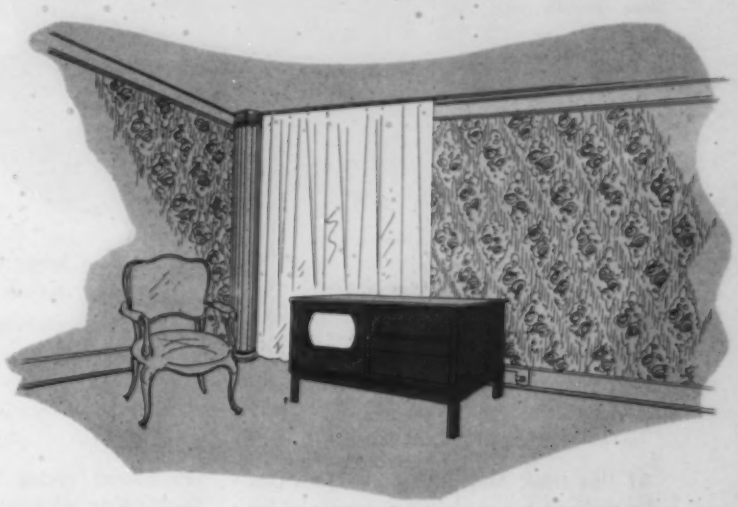
Comparison of Brightness Ranges (Values in footlamberts)

1. *The background behind the TV set must be lighted properly for visual comfort. Figured patterns should be avoided; however, a low texture is needed, such as furnished by folds of drapes, so there is something to look at when the eye moves away from the picture. Here, with the receiver in front of windows, the curtain cuts down light for daytime viewing and is lighted at night by concealed lamps*



1

2. *We won't have to eliminate figured patterns just because television has arrived in the home. A pleasing form of back lighting is obtained by concealing lights behind the receiver on the baseboard and drawing a fabric curtain over the figured wall ahead of the lights*

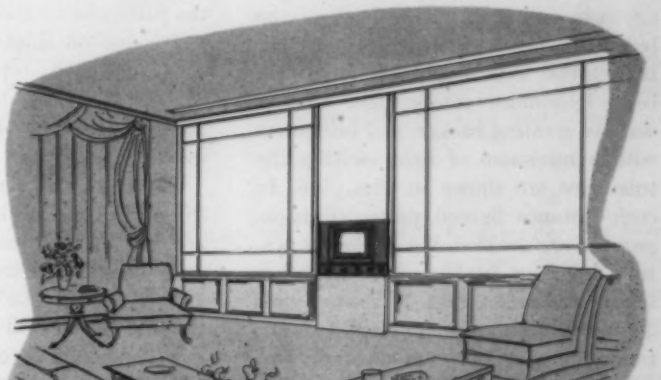


2

Lighting the Room for TV

Relief from this visual "aiming" for long periods is very desirable. This is done by having lighted areas around the television set to make it possible for the eye to "escape" from the bright picture — that is to float on and off the screen without the viewer being conscious of it.

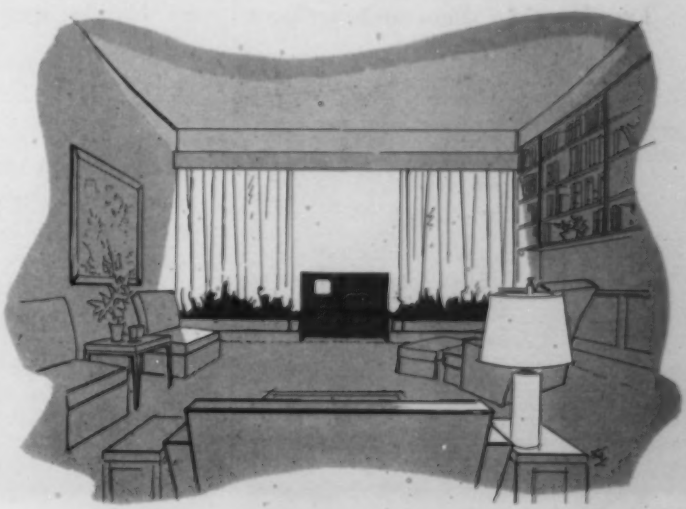
The exact value of the brightness of the background against which the picture is viewed does not appear to be critical until the borderline of comfort-discomfort is reached due to localized distribution of background light. When viewed against extensive areas of brightness, some of the better known ratios of lighting practice can be considered.



3

3. *The wall surrounding this built-in receiver gets its light from a flush ceiling unit. The drop panel which conceals the set when not in use is in the lowered position. The face of the receiver is from 3 to 5 in. back of the wall; a set-back frame also aids in shielding the television tube from light on all sides*

4. *This room uses a combination of the folds of the curtains and a plain wall for the background. Most of the light from the cove is directed down. A perforated metal strip covers the lamps on top so that a subdued light projects onto the ceiling, aiding overall illumination. The shade of the table lamp would be either opaque or of low translucence*



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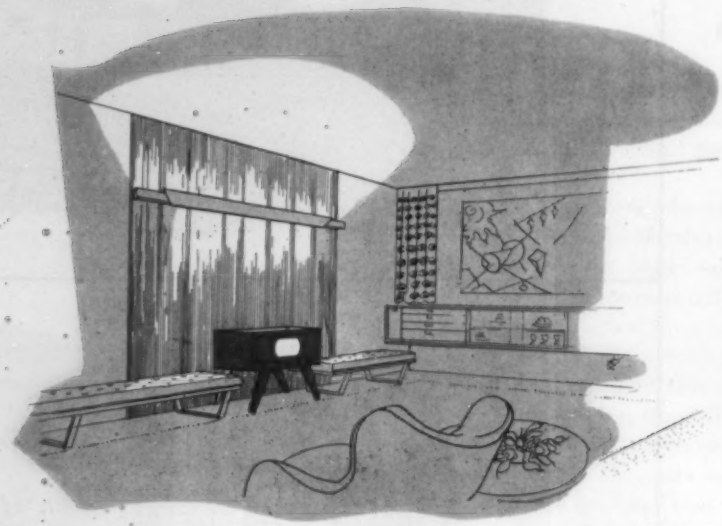


5

Striated wood paneling behind the television set affords a textural background without conspicuous character or figure. The cove is open on both bottom and top to light the background and bring up the overall room illumination. Fixture lamps should be spaced far enough from backgrounds to prevent excessive brightness, in most cases about 16 in.

At this time, and until techniques can be devised for evaluating eyestrain for long, sustained viewing periods or for relating it to other known factors, average surround brightnesses back of the picture of not less than one-tenth the background tube brightness appear to be a reasonable compromise. Various ways of creating background brightness with a minimum of light striking the tube face are shown in Figs. 1–5. In each instance figured patterned backgrounds are avoided, but whenever possible, however, backgrounds with a low texture are used so that the eye has some definite thing to look at when it moves from the picture outward and back again, but not in a definite design that would hold and distract continuously. Backgrounds neutral in color also are advantageous.

One of the most convenient lamps to use in these installations is the 30-watt Lumiline. These lamps can be arranged end-to-end giving a good continuous line of light without breaks, and can be dimmed through a very wide range of brightness to adjust the lighting to suit the particular receiver.

Turning on single lamps in a room with television, especially those that can be seen either to one side or clear around to the edge of your vision, might be very distracting.

The room that has balanced lighting throughout and in which the lamp shades are low in brightness or opaque gets away from those troubles. Bright patterns of light on the wall above or below the lamp shade will also prove distracting. The best way to avoid such distractions is to have the whole set of lamps in a room on at a low key instead of one at a moderate or high key. Complete sets of lamps with shades that are dense enough or opaque can run at somewhere around 60 to 100 watts each. Most modern television receivers when operated on good signals and adjusted for sufficient contrast are very easy to look at with overall general lighting. When the set glares at you, that is a sign that the surrounding lighting conditions are not up to where they belong.

Viewing distance should be great enough to fuse the gray horizontal lines formed on the TV screen into the picture, and to minimize the effect of electrical disturbances. (The horizontal lines, 525 in all, are caused by the way the tube's electron beam moves across the face)

Proper Viewing Distance

The television picture is "ruled" with a set of horizontal lines — about 525 on most sets, caused by the manner in which the electron beam moves back and forth across the tube — which increase in size and spacing as the tube size increases. And electrical disturbances naturally become larger with larger pictures. In order to fuse the horizontal lines into a picture and minimize the effect of picture disturbances it is desirable to view the larger and larger tubes farther and farther away. Increasing size does not do away with many of the problems. This does not mean, however, that the viewer must at all times remove himself from the largest picture to such an extent that he is no better off than if he were viewing a much smaller set at a correspondingly normal distance. There is obvious value in sheer size alone, but it may not be taken as the sole criterion.

Since tube size and viewing distance are in some ways exactly related, we can be quite specific on this point. On a 10-in. tube, the horizontal lines mentioned before occur at approximately 25 per in. When viewed at 8 ft., these lines are at the borderline of being seen in the highlights. To get the lines to fuse we need a slightly greater distance than this. A distance of one to two feet added to the basic 8 feet is desirable in not only fusing the horizontal trace pattern but also for getting the minute surface disturbances that often occur fused into a state of visual equilibrium. Then, too, this rule of distance supplies a better sense of being in focus for the most distant elements of scenes that are not presented in the best definition or in a good range of tones. Viewing distance may therefore be summarized as ten times the diameter of the picture tube plus one or two feet.

This distance rule cannot be applied to the extremely small tubes since only a general visualization can be obtained from them beyond several feet. Television sets which have a greater number of thinner horizontal lines can of course be viewed at a closer distance than the 10 times rule gives.

IMPLICATIONS OF LIGHTWEIGHT AGGREGATES

By Paul Weidlinger, Consulting Engineer, Washington, D. C.

LIGHTWEIGHT aggregates have been used in this country for more than 50 years, and experience with them during and since the war has greatly emphasized their cost-saving, thermal insulating and other advantages. So it seems rather remarkable that they have not been employed more widely. This can be attributed in part to building code restrictions, limited availability, until recently, and to a great extent to the lack of reliable and generally accepted design data.

Recognizing the need for technical information that would disclose the usefulness of lightweight aggregates in housing, the HHFA initiated an exhaustive laboratory test program at the National Bureau of Standards and the U. S. Bureau of Reclamation which has recently been completed and reported.*

We cannot say, however, that there is a generally recognized "overall theory" of lightweight aggregates and concrete because the laboratory data and practical experience have not been completely correlated. Yet there is every reason to expect extended applications of lightweight concrete because, in addition to the data now available, there are more than 50 research papers on the subject, and a great deal of manufacturers' literature and knowledge of performance under service conditions.

The purpose of this article is to acquaint the reader with the results of current research and to provide basic information that will encourage further use, experimentation and exploration.

Lightweight Concrete — Types and Uses

Lightweight concretes can be obtained either through the addition of "foaming" admixtures to Portland cement mortar or through the use of lightweight coarse and/or fine aggregates instead of sand and gravel. There are more than a dozen types of natural, processed and byproduct aggregates available (See ARCHITECTURAL RECORD, July 1948, pp. 143–145). There are a great number of applications in buildings as loose fill, mortar and concrete, the most important of these being: (1) floor and roof insulation in form of fill; (2) sound absorbing plasters; (3) fireproofing of structural members; (4) loadbearing and nonloadbearing masonry units; (5) cast-in-place or precast structural members.

For some of these applications, such as thermal insulation and sound absorption, only lightweight aggregates or concrete can be used. On the other hand fire protective and structural properties are common to both lightweight and standard concrete. In these latter applications the special properties of lightweight concrete can be understood best when compared with the standard or heavy concrete. Such comparison is very important because lightweight concrete, even on a volume basis, is ordinarily more expensive than standard aggregate concrete. Only the special advantages such as its light weight and high insulating quality make it technologically and economically competitive.

Evaluating Characteristics of Lightweight Concrete

The salient characteristic of lightweight concrete is naturally its low specific gravity. This fact deserves special consideration in view of the less publicized information that, besides timber, standard Portland cement concrete is one of our lightest structural materials. One is accustomed to think about concrete as a "heavy material" although the specific weight of standard concrete is about equal to the very "light" aluminum. From this we can draw some interesting conclusions.

Lightweight-aggregate concrete can be classified as an "extra" light material. This is not an exaggeration if one considers that some of the lightweight concretes float on water and have a spe-

Greatly needed technical data on lightweight aggregates has been made available through an extensive investigation sponsored by HHFA. Here lightweight concrete is being tested at the National Bureau of Standards for resistance to freezing and thawing cycle

* "Tests of Lightweight-Aggregate Concrete Designed for Monolithic Construction," Walter H. Price and William A. Cordon; "Lightweight-Aggregate Concrete," Ralph W. Kluge, Morris M. Sparks and Edward C. Tuma, Journal of the American Concrete Institute, V. 20, No. 8, Apr. 1949 and V. 20, No. 9, May 1949

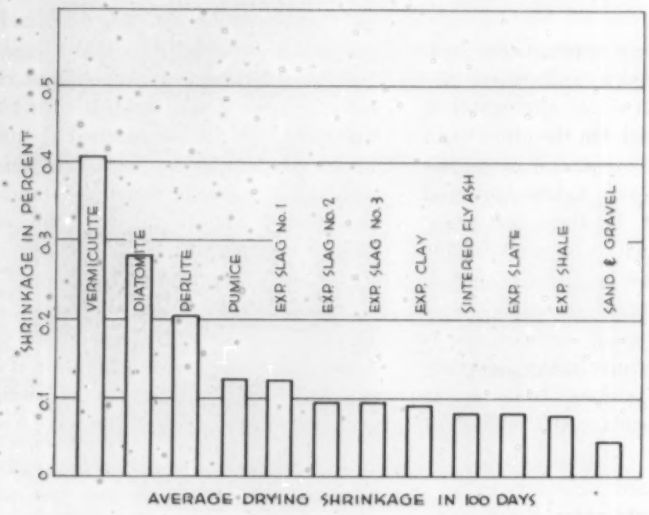
cific gravity equal to or less than wood.

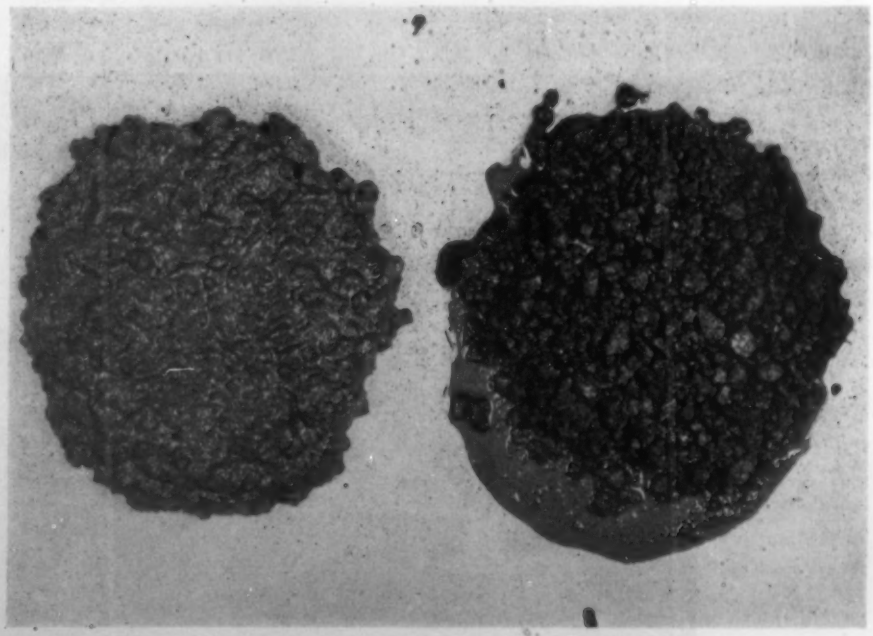
The fact that ordinary concrete and even lightweight concrete structures are heavier than comparable steel or aluminum ones shows that the low specific gravity of a structural material alone does not mean lightness of the structure as a whole. The strength-weight ratio of the material is the determining factor.

Similarly, other important physical characteristics such as thermal conductivity, hours of fire protection, sound absorption etc. should be correlated to the weight of the material to enable us to make judicious comparisons.

The same characteristic, light weight, which makes this material so useful in building construction contributes indirectly to other physical properties which require special attention if disadvantages such as higher shrinkage and lower modulus of elasticity are to be avoided. It should be emphasized that, basically, materials have no inherent "disadvantages". There is only improper use of materials due to unknown or unevaluated characteristics. The drawbacks of lightweight concrete should be understood in these terms.

The graph below shows that highly absorptive lightweight aggregates produce concretes having relatively high shrinkage. The photo illustrates the effect of an air-entraining agent on harsh lightweight-aggregate mixtures. Materials in the two samples are the same, except the one on the left has the air-entraining agent added; note the serious segregation in the right-hand sample





The principal characteristics of lightweight concrete are well summarized in a technical paper† reporting results of tests at the Bureau of Reclamation. ". . . It has many advantages not possessed by regular sand-gravel concrete. It is lighter in weight ranging from 35 to 115 lb. per cu. ft. and savings in structural steel and foundation size result from its use. Lightweight concrete has better fire resistance properties, is a better insulator against sound and heat and is as weather resistant as regular concrete. Its strength, which is roughly proportional to its weight, ranges from . . . 200 psi . . . to 5000 psi. Lightweight concrete usually costs more than regular concrete because of the higher cost of the aggregates, greater cement requirements, and the need for greater care in placing. . . ."

The last remarks on cost, while accurate, need to be qualified: the cost of the concrete alone in reinforced structures is only one of the cost components, which include also the reinforcing steel and the formwork. In terms of total cost the properly designed comparable lightweight concrete structure need not be more expensive. In a number of instances the savings are more than the added cost of concrete on volume basis.

The same paper also clearly summarizes the most important physical properties of lightweight concrete in the following conclusions:

1. The strength of lightweight concrete is dependent on the strength of the aggregate particles and the richness of the mix, but in general no amount of cement will produce concrete having strength above 1000 psi for concretes weighing less than 50 lb. per cu. ft. or above 2000 psi for concretes weighing less than 80 lb. per cu. ft., dry weight.

2. The thermal conductivity of con-

† "Tests of Lightweight Aggregate Concrete Designed for Monolithic Construction" by Walter H. Price and William A. Cordon

crete decreases as the weight of the concrete is decreased. This property of the concrete seems to be influenced more by the density of the concrete than by the characteristics of the aggregate.

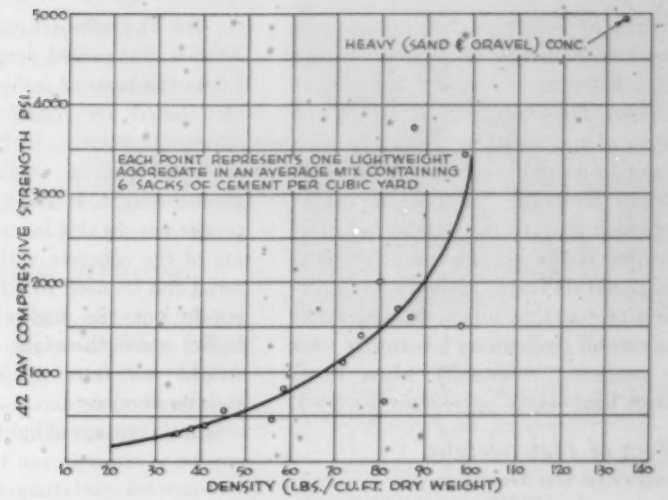
3. The lightweight concretes having strength above 2000 psi all had suitable resistance in the freezing-and-thawing tests and had comparatively low drying shrinkage. These concretes should be completely suitable for all types of concrete construction where heavy weight is not a requirement.

4. Disruption resulting from the alkali-aggregate reaction is not indicated in lightweight-aggregate concrete.

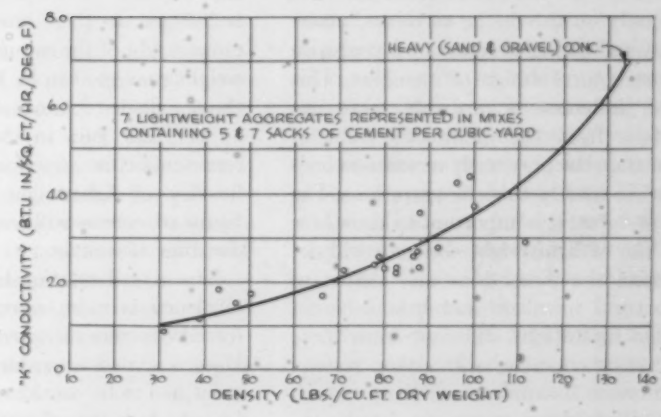
5. Air entrainment is recommended for lightweight aggregate concrete to improve workability and reduce separation during placing. The slump should be maintained at less than 2½ in. wherever possible.

6. Additional tests should be made to (a) correlate the properties of dry tamped lightweight concrete with those of plastic concrete mixes, (b) determine the bond strength of lightweight concrete to reinforcing steel, (c) investigate the flow of lightweight concrete under load and cracking tendencies of large slabs, (d) investigate the use of various admixtures and wetting agents, (e) determine the most practical gradings for various aggregates and (f) investigate comparative heat resistance properties of various lightweight concretes.

In connection with the conclusions of this paper it should be kept in mind that the additional tests which are recommended in the last paragraph do not mean that there is no information at all on these important points. Extensive data are available for various aggregates, especially on the recommended aggregate gradings, heat resistance and also bond strength. Individual manufacturers have sponsored and conducted extensive research programs to establish these data. The lack of specific recommendations at the present time suggests that the users of lightweight aggregates should follow the manufacturers' instructions, especially with regard to the design of concrete mixes and placing of concrete. These procedures are somewhat different from the ones employed for standard concrete and the insistence of engineers on such more familiar specifications can lead to the improper use.


HEAVY (SAND & GRAVEL) CONC.
EACH POINT REPRESENTS ONE LIGHTWEIGHT AGGREGATE IN AN AVERAGE MIX CONTAINING 6 SACKS OF CEMENT PER CUBIC YARD
42 DAY COMPRESSIVE STRENGTH PSI.
5000
4000
3000
2000
1000
10 20 30 40 50 60 70 80 90 100 110 120 130 140
DENSITY (LBS./CU.FT. DRY WEIGHT)

Graphs from Journal of the American Concrete Institute


HEAVY (SAND & GRAVEL) CONC.
7 LIGHTWEIGHT AGGREGATES REPRESENTED IN MIXES CONTAINING 5 & 7 SACKS OF CEMENT PER CUBIC YARD
"K" CONDUCTIVITY (BTU IN/SQ FT/HR/DEG F)
8.0
6.0
4.0
2.0
0
10 20 30 40 50 60 70 80 90 100 110 120 130 140
DENSITY (LBS./CU.FT. DRY WEIGHT)

Top graph plots compressive strengths of lightweight concretes tested at the Bureau of Reclamation. In general, no amount of cement will give strengths above 1000 psi for concretes weighing less than 50 lb. per cu. ft. or above 2000 psi for those weighing less than 80 lb. per cu. ft. Bottom graph shows that thermal conductivity decreases almost linearly as the weight decreases

Following are some of the features in which the lightweight concrete mixes and placement differ from the standard:

1. Maximum size of particles is usually less than in standard concrete.

2. Air entrainment is almost always advisable in lightweight concrete.

3. Cement factor should be kept as low as possible consistent with strength to reduce shrinkage and also weight. The strength of the mix should be kept as close to the design value as possible through careful control on the job, since higher strength concrete has lowered impact resistance.

4. Curing properties of lightweight concrete are generally more favorable than those of standard concrete because of the slower release of moisture.

5. If at all possible, lightweight concrete should have lightweight aggregates only, avoiding the use of sand which increases shrinkage.

6. Finally it should be remembered that not *all* lightweight aggregates are suitable for use in structural concrete. Some extremely light concretes while excellent as fireproofing and insulation have such low strength that they cannot be employed structurally.

These are rather random examples to show the difference in production and design between heavy and lightweight concrete. They also will influence the writing of specifications, especially with respect to weight and permissible tolerances in gradation. The most important conclusion to draw from these facts and examples is the importance of employing specialists in the design and supervision of concrete mixes. In important jobs careful preliminary laboratory tests are necessary, especially when lesser known lightweight aggregates are used.

Effect of Lightweight Concrete On Design

It is obvious that the different mechanical characteristics of lightweight concrete will exert considerable influence not only on the design of mixes, placement and curing of concrete, but also on the structural design of members. This latter influence is probably more important from the architect's point of view than the previously mentioned ones relating mostly to field operations. For the architect it is important to know how the use of lightweight concrete will determine the dimensions and shapes of structural members and how inherent design limitations, different from those of heavy concrete, will either restrict or increase its application. Even though there have been numerous articles on lightweight aggregates and lightweight concrete this question has not been given as much attention as it deserves; therefore, some of the more important design procedures will be discussed briefly.

In getting acquainted with an unfamiliar material it is always useful to get the "feel" of it by comparisons and illustrations. For this purpose the following comparisons are suggested, based on the strength-weight ratios.

Material	Relative Strength-Weight Ratio	Relative Density
Standard (Heavy) Concrete	1.0	1.00
Lightweight Concrete	1.5	0.67
Soft Wood	8.0	0.23
Structural Steel	10.0	3.20
Duraluminum	30.0	1.14

In the foregoing table both heavy and light concrete were assumed to have an ultimate compressive strength of 2000 psi and the lightweight concrete was assumed to have a density of 100 lb. per cu. ft. The strength-weight ratio and density of standard concrete was set at 1.0 as the basis of comparison. This table (based on round figures) shows clearly the relative inefficiency of plain concrete against other materials of greater weight. It also indicates that by proper use, in this instance by reinforcing of the concrete with steel, the material can be used to advantage. It also points out the higher efficiency (i.e. higher strength-weight ratio) of lightweight concrete, as compared with standard concrete.

The advantage of lightweight concrete can be visualized even better by taking two unreinforced concrete columns, having equal cross sections and heights such that the compression at the bottom of the columns under their own weight is 2000 psi. In these examples the maximum height of the column made of lightweight concrete can be 1.5 times that of the one made of standard concrete. This 50 per cent gain in theoretical height represents the superior structural efficiency of lightweight concrete. This figure of course will vary for different densities of concrete.

The actual relationship of structural efficiency is more complex when reinforced concrete members are compared. Here a second important physical constant has to be considered — the modulus of elasticity of the concrete. The value of this constant has important bearing on the effectiveness of reinforcing steel. The modulus of elasticity is influenced to a great extent by the type of aggregate employed and also by the cement content. It is also directly related to the strength of the concrete. In general the modulus of elasticity of lightweight concrete is about half as much as that of the standard concrete of equal strength. This means that the ratio between the elastic modulus of steel and lightweight concrete is higher than for standard concrete; therefore, the neutral axis of the lightweight concrete girder or slab is lower than that of the heavy concrete slab. This results in a higher resisting moment for the lightweight concrete member. The implications can be summarized as follows: *A higher percentage of reinforcing steel is required in lightweight concrete members, but the depth of the member can be decreased with resulting savings in concrete and formwork. The reduction of concrete in slabs ranges from 15 to 20 per cent and the increase in steel from 11 to 17 per cent. In rectangular girders the savings in concrete is greater and the increase in steel less than this. In T beams actual savings in steel can be obtained due to reduced dead load. Compressive reinforcement is more effective in all circumstances in lightweight concrete.* The deflection of such members is about 30 per cent higher than that of members made of standard concrete. In general it can be stated that members designed in lightweight concrete will not only be lighter in weight but also in appearance. This conclusion is particularly interesting when contrasting two other familiar "light" and "heavy" structural materials, namely aluminum and steel. Here the situation is reversed — aluminum members, although lighter, will be bulkier in appearance than steel.

The above conclusions can be visualized in a number of ways. The best illustration is the dead load — live load ratio, examples of which are given in the following table comparing 2000 psi heavy and lightweight concrete rectangular girders for various spans:

RATIO OF DEAD LOAD TO LIVE LOAD IN PER CENT
(Assumed Live Load = 500 lb. per ft.)

Span In Ft.	Heavy Concrete %	Lightweight Concrete %
10	6.5	14.5
20	17.0	34.5
30	32.0	72.0

The weight saving is quite apparent, and it increases with increasing spans. With the use of higher strength concrete the savings are less marked which indicates the range of application for lightweight concrete.

Weight savings can be illustrated further by calculating the maximum span of two cantilever girders (light and heavy concrete) of equal dimensions and equal amount reinforcing, assuming that both carry their own weight only and do not exceed the allowable stresses. Such computations show that the lightweight concrete girder will be 41 per cent longer than the one made of heavy concrete.

These examples are to serve only as illustrations of the potentialities and limitations of lightweight structural concrete. The conclusion to be reemphasized is that lightweight concrete members are lighter and they look lighter. This fact alone should be of great interest to the designing architect.

CONCRETE BLOCKS

Soffit blocks for economical concrete construction of floors and roofs are now being fabricated from *Durisol*, a lightweight concrete material which combines chemically mineralized wood shavings with Portland cement.

The blocks provide the integral forms for reinforced concrete joists and slabs, becoming a part of the floor or ceiling, and are also reported to provide thermal and sound insulation and acoustical control.

Soffit blocks make possible several economies, according to the manufacturer: they may be laid on minimum framework and thus require less shoring lumber and lumber of smaller dimensions; their large size and light weight permit faster installation; less concrete is required to attain floor strength comparable to ordinary poured concrete; they provide an acoustic ceiling at no extra cost, or if a plastered ceiling is desired, they provide a plaster base; faster plastering is possible because less pressure by the plasterer on the trowel is required.

Measuring 24 in. wide by 48 in. long, the blocks are available in depths of 7½, 9½ and 11½ in. Durisol, Inc., 420 Lexington Ave., New York, N. Y.

ROOF DE-ICING KITS

Damage caused by snow and ice accumulating on the roof is said to be prevented with the new *Rockbestos Roof De-Icing Kit.*

The kit consists of 60 ft. of lead sheathed heating cable complete with standard plug, shingle clamps for attaching the cable to the roof and installation instructions.

Looped around the edge of the roof, the cable melts channels through the ice, allowing the water to drain away normally.

Rated at 60 watts and designed for operation from 110 to 120 volts, a kit is reported to protect from 18 to 20 ft. of roof from ice dams. Rockbestos Products Corp., New Haven 6, Conn.

PLASTIC ASPHALT TILE

High resistance to oils, greases, fats, alkali and wear and a new monochromatic concept of coloring are said to be combined in a resilient plastic asphalt tile called *Arlon.*

Manufactured from a combination of plastic and asphalt compounds, the new material is reported to have a high enough resistance to alkali to make it practical for installation on grade or below grade, as well as on suspended wood or concrete subfloors.

Arlon, which is available in eleven shades, is produced in ⅛ and 3/16 in. gauges and only in tiles 9 by 9 in. Armstrong Cork Co., Lancaster, Pa.

SOUND POWERED TELEPHONES

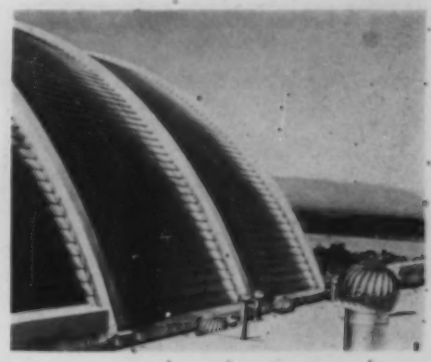
Designed to operate without batteries or any outside power for either talking or ringing circuits, *Sound Powered Telephones* for industrial use are said to insure full tone and clarity of speech reception.

All operating parts are mounted on the cover, which lifts off, leaving the case conveniently free for installation of interstation wiring.

Ring gaskets of synthetic rubber are used to seal all openings in the rugged aluminum case, providing complete watertightness, according to the manufacturer.

Each station consists of a sound-powered telephone handset mounted on the aluminum case, which contains a magneto generator, a howler unit with connecting horn for signaling, necessary terminal blocks and, if selective ringing is desired, a rotary selector switch.

Common-talking, selective-ringing systems up to 24 stations or an unlimited number of common-ringing stations can be used per system. United States Instrument Corp., 409 Broad St., Summit, N. J.



Aluminum roofing sheets 10 ft. long and 12 in. wide used for gymnasium-auditorium

ALUMINUM ROOFING

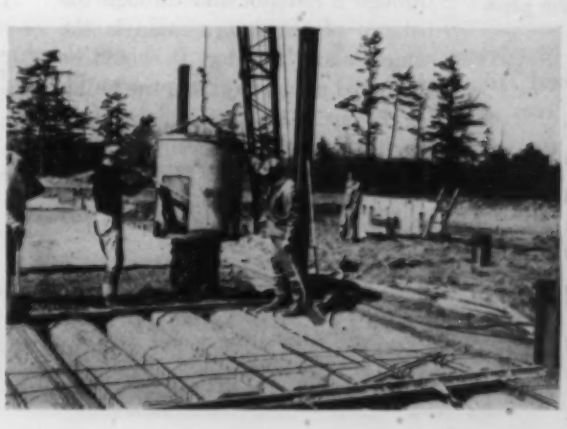
Alumalex Bermuda Roofing, developed to combine eye appeal with the functional qualities of increasingly popular aluminum roofing, is patterned after the Bermuda style of wide exposure to weather, thick butt lines creating heavy shadow lines, and interesting texture.

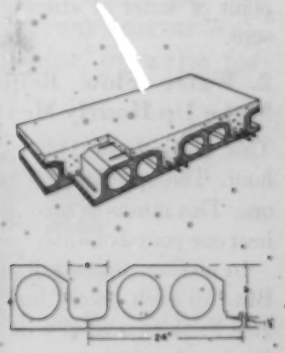
Installed over wood sheathing and fully supported, Alumalex Bermuda Roofing includes factory-prefabricated field sheets and essential accessories such as hips, valleys, gable and rake strips for ease of installation.

The sheets, 10 ft. long with 12 in. exposed, are joined in a water-proof "Joiner Strip" eliminating overlaps. Hips and valleys are joined to the field sheets with the same strip. Alumalex Co., Inc., 517 West Garfield Ave., Glendale 4, Calif.

(*Continued on page 190*)

Soffit blocks fabricated of Durisol, lightweight concrete material, provide integral forms for reinforced concrete slabs and joists, becoming part of floor or ceiling. Thermal and sound insulation as well as acoustical control are said to be achieved

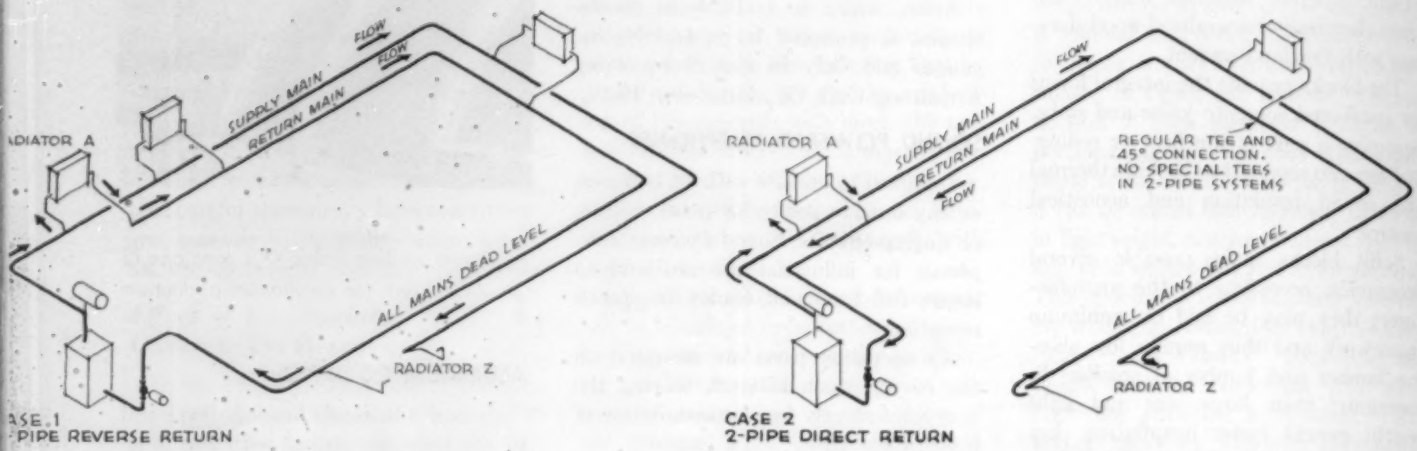




HEATING SYSTEMS FOR HOUSES

Forced Hot Water Systems: 5 — Two-Pipe Systems

By William J. McGuinness
Professor of Architectural Engineering
Pratt Institute



TYPES OF TWO-PIPE HOT WATER SYSTEMS

The 2-pipe direct return saves a little pipe but the reverse return is much preferable and usually chosen. Note (Case 1) that the length of circuit supply and return to "A" is identical with that to "Z" giving equal heating. In Case 2 note how much favored radiator "A" is by comparison with the long travel to and from "Z." On a straightway circuit the piping needed for Case 1 is even greater. It is chosen, however, for its equal length of run and return to every radiator

1. Average Water Temperature and Temperature Drop in the System

With closed systems under pressure it is possible to circulate water at or above the temperature of the boiling point of water if desired, without generating steam, because the boiling point of water increases with increasing pressure. A frequently used range of temperature and one that is used in this design is as follows: the average temperature of water in the system is 197 F. The drop in temperature between the boiler delivery and return water is 20 F. Thus the water will leave the boiler at about 207 F and return at about 187 F. This is in case we are running below the boiling point of water at atmospheric pressure.

2. Water Flow Required to Make Up Hourly Heat Loss

This house loses 118,000 Btu. per hour. The specific heat of water is one. This means it takes one Btu. to heat one pound of water one degree F.

In cooling, water will give off one Btu. for each pound losing one degree F. With a fixed heat loss and a fixed water temperature drop, the equation for quantity of water to be circulated becomes — Gallons per minute x 8 pounds per gallon x 1 Btu. per pound x 20 degrees F equals Btu. per hour heat loss, or

GPM x 60 x 8 x 1 x 20 = Btu./Hr.

or $\text{GPM} = \frac{\text{Btu/Hr.}}{9600}$

which is a standard formula for these conditions. Substituting the actual value of 118,000 Btu. per hour heat loss we arrive at 12.2 gallons per minute to be circulated in order to make up the hourly heat loss.

3. Length and Equivalent Length of Circuit

In a two-pipe reverse return system the length of travel of water from the boiler through the supply main, through a radiator and through the balance of the return main is the same for any radiator. It should be computed accurately from the building layout. This installation has a length of travel of approximately 184 ft. as follows:

width	30 ft.
	30
length	50
	50
height	8
	8
runouts (1 rad.)	8
	184 feet

The "Equivalent Total Length" is a length of imaginary straight pipe equivalent to the run computed above plus an allowance for the resistance of fittings, boiler, valves, etc. On large jobs of unusual design it is customary to compute this accurately. For our purpose it is sufficient to add 50 per cent. The equivalent total length of this installation is thus 184 x 1.50 = 276 ft. This will be used in later calculations.

4. Select a Pump

Besides selecting a pump it is necessary to establish sizes for all pipes. One step depends on the other. The amount of water pumped through per minute must not vary. This is 12.2 gallons per minute. A powerful pump can circulate at this rate through very small pipes while a weak pump can deliver the same quantity per minute only through large pipes. If from Chart 1 (ARCHITECTURAL RECORD, Sept. 1949, p. 149) we select a 1½ in. pump we discover that it will pump our 12.2 gallons per minute against a "head" of 6.4 ft. Now it is necessary to select a piping system that offers resistance of the value of 6.4 ft. to assure flow of 12.2 gallons per minute.

(Continued on page 157)

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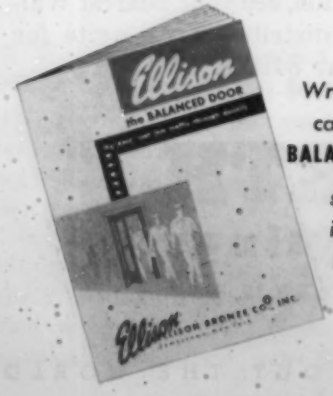

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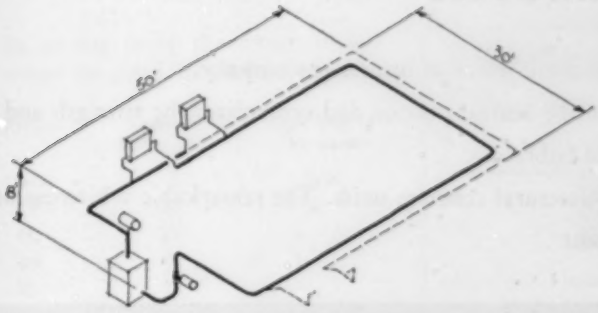
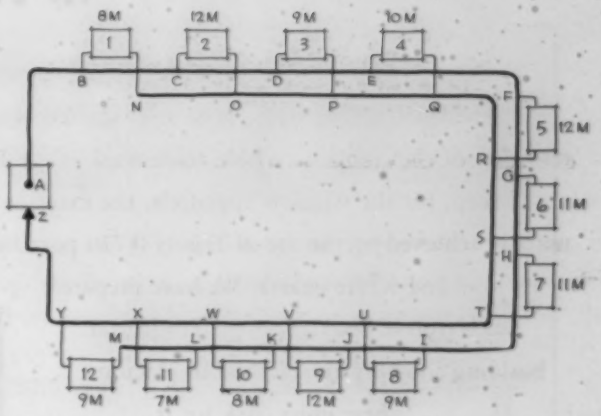
HEATING SYSTEMS FOR HOUSES

(Continued from page 154)

Forced Hot Water Systems: 6—Design of Two-Pipe Systems

By William J. McGuinness





A TYPICAL DESIGN OF A 2-PIPE REVERSE RETURN FORCED CIRCULATION HOT WATER HEATING SYSTEM

Left: Sketch showing general dimensions of the system and the length of the circuit through one (any) radiator. Right: General plan layout identifying the mains, numbering each radiator and giving each room heat loss in thousands of Btu./hr. Example: 8M = 8000 Btu./hr.

5. Meaning of Pressure Drop in Millinches Per Foot

"Feet of head" means that the 1½ in. pump will deliver 12.2 gallons per minute if it is raising the water 6.4 ft. in height. Since the heating circuit is a closed one the water returns to the same level and the only resistance to pumping is a frictional one. The water must leave the pump at a pressure which would be caused by a 6.4 ft. height of water and at the end of the "equivalent length" the pressure will be zero. Thus the water loses 6.4 ft. of head in 276 ft. of pipe. A millinch is one one-thousandth of an inch. There are thus 12,000 millinches in one foot of height. Lost in the system will be 6.4 x 12,000 millinches or 76,800. The loss per foot will be $\frac{76,800}{276}$ or 270 millinches per foot. If this loss is maintained the circulation will be correct. It is possible to establish this millinch loss directly from Table 1 (ARCHITECTURAL RECORD, Sept. 1949, p. 153) which has the results of calculations such as we have completed above. In the left hand column of Section A the closest head is 6½ ft. Go to the right until you reach the nearest total equivalent length. This is 260. Directly below in this column in the horizontal line labelled "Millinches" is the value 300 millinches per foot. This is close enough for our purpose to the accurately computed value of 270 arrived at previously. This table is used always instead of the calculation which was made to explain the process. We shall now use the "300 Millinch Column" in selecting all pipe sizes.

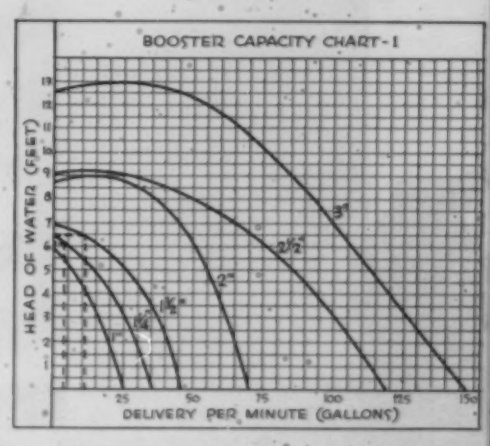
This is a good average pressure loss. High pressure drops result in speed and noise and low pressure drops result in slow speed and consequent slow response.

6. Selecting of Mains and Returns

Section B of Table 1 (ARCHITECTURAL RECORD, Sept. 1949, p. 153 and supplement herewith) gives the size of mains and returns at the left for any value of heat per hour to be delivered, the latter being read in the 300 millinch column. The supply mains are thus sized as follows:

Main	Capacity M Btu./Hr.	Size to be used
AB	118	1¼ in.
BC	110	1¼
CD	98	1¼
DE	89	1¼
EF	79	1¼
FG	67	1¼
GH	56	1¼
HI	45	1
IJ	36	1
JK	24	¾
KL	16	¾
LM	9	½

(Continued on page 159)



MAIN CAPACITIES (In Thousands of BTU.)
(Supplement to Table 1, Section B, ARCHITECTURAL RECORD, Sept. 1949, p. 153)

PIPE SIZE	MILLINCHES 600	500	400	350	300	250	200	150	100
½"	19.1	18.2	16.3	15.1	13	12.5	10.8	9.2	7
¾"	41	37.7	33	30.5	28	26.7	23.5	20	15

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CREDITS

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The Prudential Insurance Co. of America

Architects:
Walter Wurdeman & Weldon Becket, Los Angeles

Structural Engineers:
Murray Erick Associates

Mechanical Engineer:
Ralph E. Phillips

General Contractor:
Wm. Simpson Construction Co., Los Angeles

Architectural Concrete Units Manufacturers:
Wailes-Bageman, Los Angeles, and Otto Buehner & Co., Salt Lake City

Masonry Contractor:
Thomas B. Childs, Salt Lake City

HEATING SYSTEMS FOR HOUSES

(Continued from page 157)

Forced Hot Water Systems: 7—Design of Two-Pipe Systems Continued

By William J. McGuinness

In reverse order the return mains would be sized in similar manner.

Return	Capacity M Btu./Hr.	Pipe Size to be used
NO	8	½ in.
OP	20	¾
PQ	29	1
QR	39	1
RS	51	1
ST	62	1¼
TU	73	1¼
UV	82	1¼
VW	94	1¼
WX	102	1¼
XY	109	1¼
YZ	118	1¼

7. Radiator Branch Size

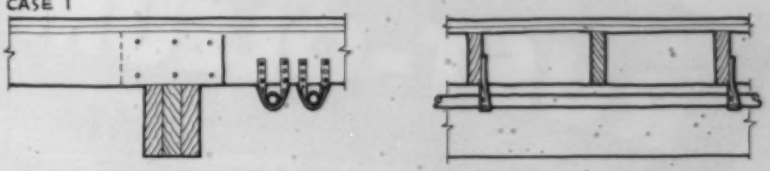
The size of all radiator branches both supply and return will be ½ in. selected also from Section B of Table 1 on the same basis. There it is seen that a ½ in. pipe carries 13,000 Btu. per hour at this pressure drop which is more than that required by any radiator.

8. Selection of Radiators

The heat emission from one square foot of cast iron radiation depends upon the temperature of the steam or water inside and the temperature on the other, or room, side. The room side is 70 as in most systems, but instead of 212 F temperature as in steam systems the average temperature of the water is 197 F. So instead of 240 Btu. per sq. ft. per hour as in the case of steam radiation the hourly emission is somewhat less and can be found from standard tables. At 197 F this is found to be 200 Btu. per hour per sq. ft. of radiation by reference to Table 3. In each case then the hourly loss is divided by 200 to arrive at the sq. ft. of radiation required. Radiator No. 1 must have 40 sq. ft., No. 2 60 sq. ft. and so forth. The total radiation for the house is 590 sq. ft. The individual radiators may be selected from the standard sizes given in the table included in the section on one-pipe steam systems. (ARCHITECTURAL RECORD, Aug. 1949, p. 146). While copper convectors are quite popular, they have not been considered here because they involve slight variations from the standard procedure given here.

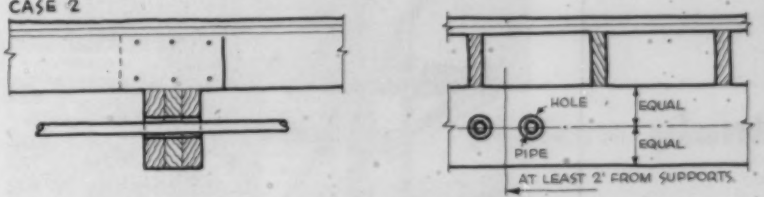
STRUCTURAL DETAILS

CASE 1



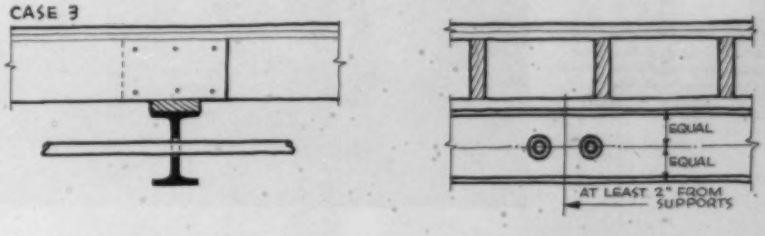
Mains not passing through girders can be supported dead level directly below joists but with slight clearance to prevent noise caused by expansion.

CASE 2



In average installations having mains of about 1" diameter, holes slightly oversize for clearance will provide convenient passage for the pipes without weakening girder, if holes are kept at mid-height and away from supports.

CASE 3



Similar arrangement with steel girder. In Cases 2 and 3 pipes should be supported on hangers, should not rest on bottom of girder-hole, which would result in noise during expansion. All mains and returns in forced systems can be level

TABLE 3

HEAT EMISSION—HOT WATER RADIATORS		
EMISSION PER SQ. FT.	AVERAGE RAD. TEMPERATURE	BOILER TEMPERATURE
240 BTU	215°	225°
225 BTU	210°	220°
200 BTU	197°	210°
180 BTU	190°	200°
160 BTU	175°	185°
150 BTU	170°	180°

9. Selection of a Boiler

If this house has normal requirements for domestic hot water, the figure of 590 sq. ft. of radiation and the kind of firing, oil in this case, are the only items of information necessary to select a boiler to carry the load.

Most manufacturers rate their boilers at the connected load and make allowance for pipe heat loss and pick up from cold condition as well as an allowance for normal domestic hot water requirements. It is well to read the boiler ratings carefully in the manufacturer's catalogue.

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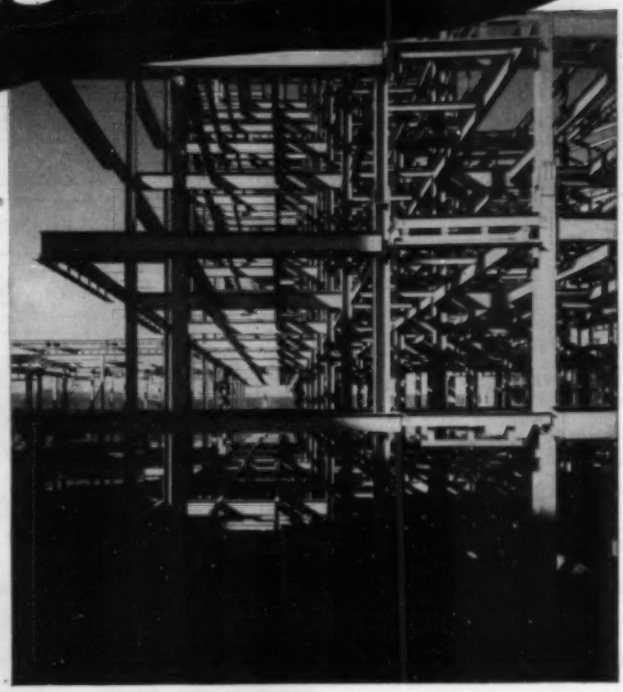

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THE RECORD REPORTS

(*Continued from page 28*)

and 1946. Olindo Grossi was the other scholarship recipient for 1949.

Modular Information Asked

Dimensional Coordination, as carried on under the A62 Project of the American Standards Assn., and sponsored by the A.I.A. and the Producers' Council, requires information as to how many firms have converted wholly or in part to modular sizes for their products. For the benefit of the project, the association is now asking if all firms who have converted will file their names as soon as possible with the secretary of the project whose name and address follows: W. H. Deacy, Sr., Secretary, ASA Committee A62, American Standards Assn., 70 East 45 St., New York City.

Public Service Records Cited

The public service records of Lieut. Gen. Raymond A. Wheeler, Maj. Gen. Philip B. Fleming and Maj. Gen. U. S. Grant III have been cited by the A.I.A. in an announcement of resolutions of appreciation recently adopted by the executive committee of The Institute. Service in the public interest by the public officials in their administrative positions has been characterized by a consistent concern for the furtherance of good architecture and sound planning, the Institute statement revealed.

Report Presentation

A report entitled "The Significance of the Work of the New York City Housing Authority" has been presented to General Thomas F. Farrell, Housing Authority chairman, by Walter F. Kilham, Jr., president of the New York Chapter, A.I.A. The report is the culmination of two years study of the Authority's completed projects by the chapter's committee on housing, under the chairmanship of Arthur C. Holden.

Cleveland Chapter Officers

Announcement has been made of officers elected to serve the Cleveland Chapter, A.I.A., for the year 1949–50. President will be Paul C. Ruth, of the firm of Conrad, Hays, Simpson & Ruth; Carl F. Guenther, of Outcault, Guenther & Associates, will be vice president; Lottie B. Helwick, associate of Spahn & Barnes, was named secretary, and Morton Leavitt, of Leavitt & Spieth, treasurer.

(*Continued on page 162*)

B & G *Hydro-Flo* HEATING

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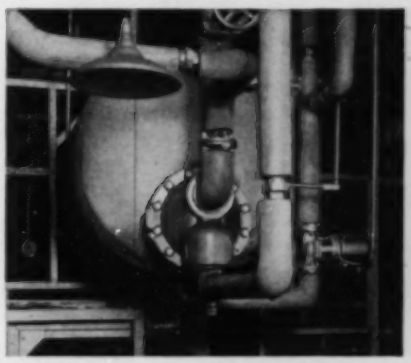

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THE RECORD REPORTS

(*Continued from page 160*)

STUDY ABROAD

An important step in opening the way for graduates of American schools of architecture to be admitted to the renowned French school of fine arts, the École des Beaux Arts, has been announced by the A.I.A.

Until recently, graduates of American schools of architecture have been admitted to the École des Beaux Arts only after a detailed qualification procedure. Under the new arrangement with the French school, worked out by Julian Clarence Levi, New York, chairman of the Committee on International Relations of the A.I.A., selected graduates of American schools will be admitted without examination.

In effect, selected architects will have the benefit of study at the expense of the French government, since the school is supported by the government and has no tuition fees, Mr. Levi said.

The step marks recognition of the high standing of architectural education in the United States, Mr. Levi commented.

The École des Beaux Arts will now accept up to 10 graduates of schools which are members of the Association of Collegiate Schools of Architecture. Selection will be made by a committee of the A.I.A. on the basis of applicants' scholastic records, architectural designs and other criteria. Members of the committee are Leopold Arnaud, dean of the School of Arts, Columbia University; George S. Koyl, dean of the School of Fine Arts, University of Pennsylvania; Charles Butler, New York, practicing architect, and Mr. Levi.

EXPERIMENTAL MASONRY WALL

Over 2000 specimens of stone from 47 states and 16 foreign countries face an experimental masonry wall recently erected at the National Bureau of Standards. The wall will be used for study of all phases of the weathering process on the numerous varieties of stone, as an aid in developing more reliable laboratory methods for predicting durability. The complete investigation, which is being conducted by D. W. Kessler and R. E. Anderson, of the Bureau's Building Stone Laboratory, will doubtless require many years, but some parts of the study will yield results in a comparatively short time. The wall is a

(*Continued on page 164*)

Abel Faidy, *Designer*

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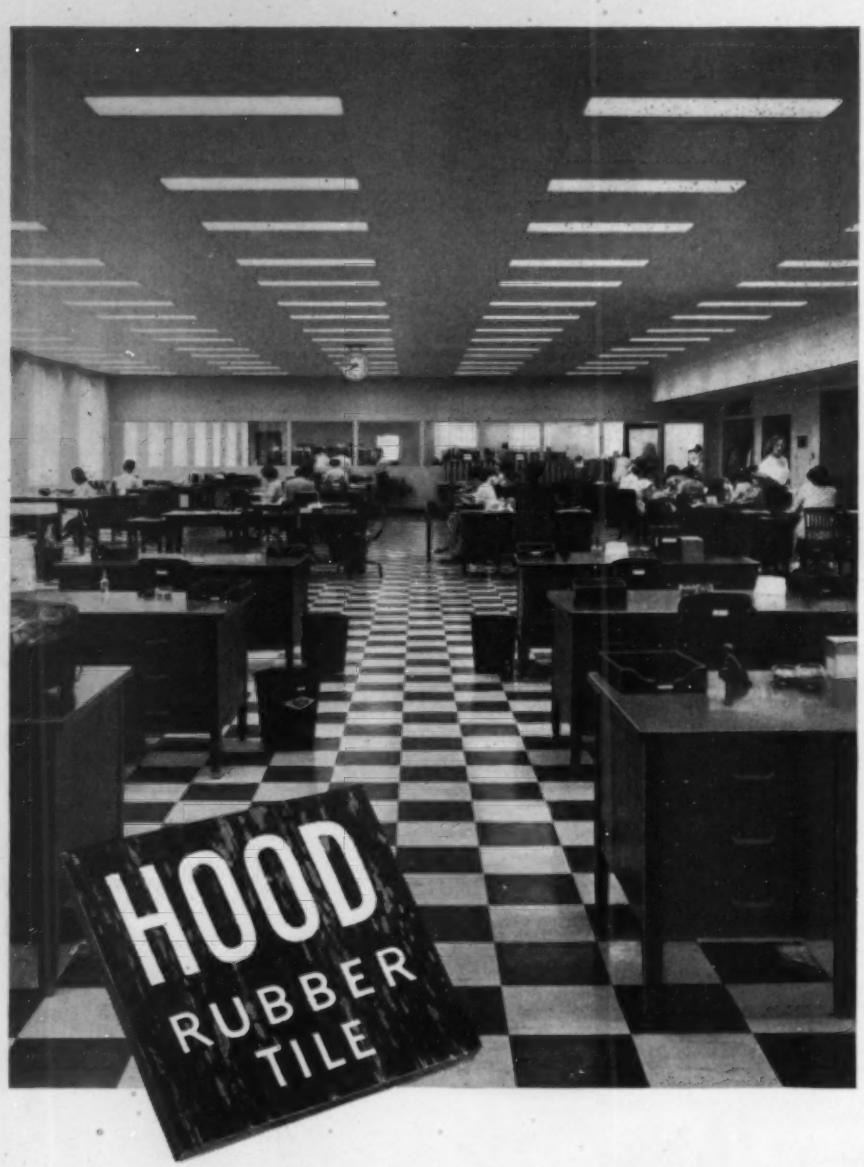

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HOOD *ASPHALT TILE*

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THE RECORD REPORTS

(*Continued from page 162*)

cooperative project initiated by the Bureau and the American Society for Testing Materials. Several other organizations, including producers of stone, have cooperated by supplying materials or advice.

A number of problems connected with the weathering of stone can be studied in the one structure, among them: the permanence of color, discoloration, effects of combining different types of stone, waterproofing, durability, and dimensional stability.

EXHIBITS

At the Modern Museum

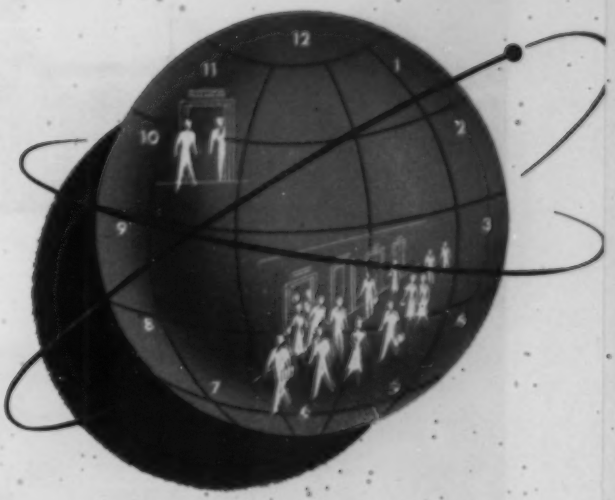
An exhibition, "Modern Art in Your Life," to show how modern art is a source and instigating force for much of our daily environment is now on display at the Museum of Modern Art. The showing relates "applied" art to the "purer" forms which are frequently said to be its source and has been assembled in celebration of the museum's 20th anniversary by Rene d'Harnoncourt, director of the Museum's curatorial departments, in collaboration with Robert Goldwater, author, associate professor of art history at Queens College and editor of the *Magazine of Art*.

The exhibit features buildings, furniture, useful objects, shop displays and advertisements in their relationship to works of art sometimes considered meaningless. The tracing of antecedents of commercial projects to their abstract sources covers many styles of modern art with a view to the broad effect of this school upon modern living.

Modern in Detroit

A comprehensive exhibit, "For Modern Living," featuring some 3210 objects drawn from daily life and gathered in an attempt to reach "all the people and their daily lives," is being staged at the Detroit Institute of Arts through Nov. 20. Criteria in selecting objects for display, as stated by Alexander Girard, architect and show director, were, did they show "results of a good understanding of a special individual problem?" As a result the display features articles from sunglasses to a baby's pink plastic toilet seat, including designs from nine foreign countries, and a 40 ft. mural by Saul Steinberg, the cartoonist.

(*News continued on page 166*)



1407 BROADWAY NEW YORK CITY buys OTIS AUTOTRONIC ELEVATORING

1407 Broadway is to be the "Prestige Headquarters" of the textile and allied industries. Everything's advance-styled. Vertical transportation will be an entirely new concept of elevatoring. For Otis AUTOTRONIC Traffic-Timed ELEVATORING is the only system that is timed to the 6 traffic patterns of the entire business day. It excels at reducing passenger waiting time — not only during peak-traffic hours but also during the equally important between-peak periods.

It keeps cars evenly spaced throughout the building automatically. They can't bunch at terminals or landings. All floors, all tenants receive prompt, continuous service — with an expense-saving minimum number of cars.

In addition, Otis AUTOTRONIC Traffic-Timed ELEVATORING is dramatic! A passenger merely "touches", not pushes, an electronic directional arrow in the landing fixture. The arrow glows, the call registers, and a car arrives — as if by magic.

Otis Booklet B-721-F explains how AUTOTRONIC ELEVATORING will keep NEW or MODERNIZED buildings on preferred renting lists for years, years, years. Otis Elevator Company, 260 11th Ave., New York 1, N. Y.

1407 Broadway Realty Corporation, Builders; William Zeckendorf, Chairman of the Board; S. M. Hirsch, President; Kahn & Jacobs, Architects.

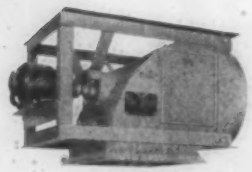
Otis

AUTOTRONIC
traffic-timed
ELEVATORING

31 other NEW and MODERNIZED office buildings, hotels, banks and department stores have also bought this entirely new concept of elevatoring.

with Wing Draft Inducers

The illustrations above show in striking fashion the difference in the appearance of the same building after removal of the unsightly stack. With Wing Draft Inducers it is no longer necessary to mar the appearance of otherwise well designed buildings with stacks of this type. By utilizing a low chimney, together with a Wing Draft Inducer, proper draft is assured—substantial savings in building costs are registered.



Wing Draft Inducers are suitable for use with oil, gas, stokered, or hand-fired boilers, moderate sized high pressure steam plants and industrial furnaces. Write today for a copy of Bulletin I-10.

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WING

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THE RECORD REPORTS

(*News continued from page 164*)

ON THE CALENDAR

Through Nov. 20: "For Modern Living," exhibition of contemporary design in home furnishings and objects, Detroit Institute of Arts, Detroit, Mich.

Through Dec. 4: 20th Anniversary Exhibition: Modern Art in the Modern World, Museum of Modern Art, New York City.

Nov. 13–16: 16th Annual Meeting, National Assn. of Housing Officials, Copley Plaza Hotel, Boston, Mass.

Nov. 17: Educators Conference, Regional Convention, Central States District, A.I.A., Hotel Sheraton, St. Louis, Mo.

Nov. 18–19: Regional Convention, Central States District, A.I.A., Hotel Sheraton, St. Louis, Mo.

Dec. 4–10: 7th Panamerican Congress of Architects, including an Industrial and Commercial Exposition of architectural construction materials and methods, Havana, Cuba.

Jan. 18–20: Annual Meeting, American Society of Civil Engineers, New York City.

Jan. 23–27: Southwest Air Conditioning Exposition of the International Heating and Ventilating Exposition, Dallas, Tex.

Jan. 30–Feb. 3: 25th semi-annual Los Angeles Furniture Market, Los Angeles, Calif.

BUILDING NOTES

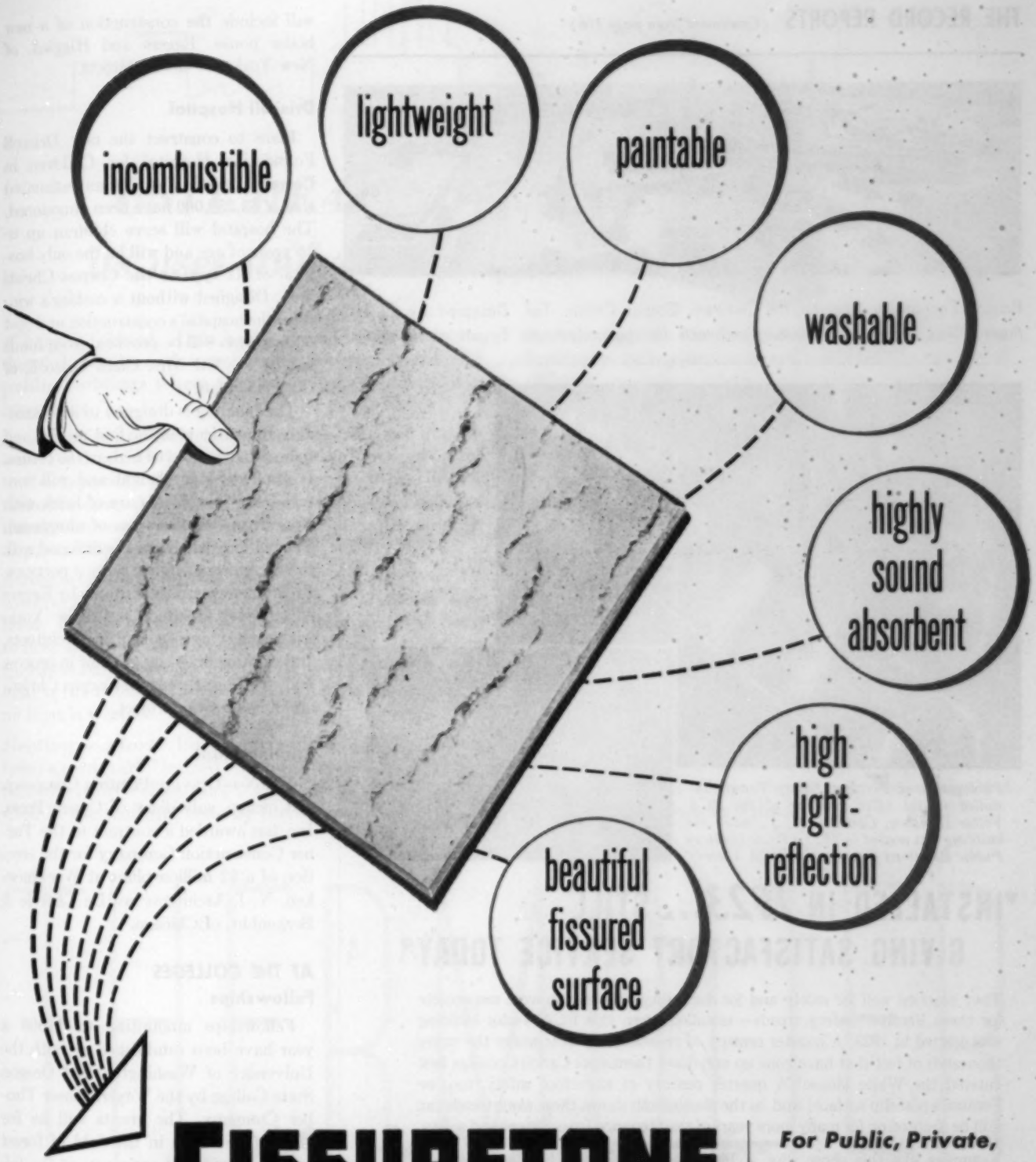
Parkway Apartments

The "Parkway," four 10-story apartment buildings containing 1744 suites and a modern shopping center, is under construction on the site of the former Ollemar estate in Irvington, N. J. New Jersey's largest FHA-insured mortgage to date, totalling $14,316,000, has been made on the project, first units of which are scheduled for occupancy in the summer of 1950. Estimated cost is $20 million. Kelly & Gruzen are architects for the project. Maurice and George Levin are the builders.

Hospital Alterations

The Catholic Archdiocese of New York has awarded a contract to the Turner Construction Company for alterations and additions to St. Francis Hospital, Poughkeepsie, N. Y., at a cost of approximately $2,150,000. The addition will be a four-story structure and alterations

(*Continued on page 168*)



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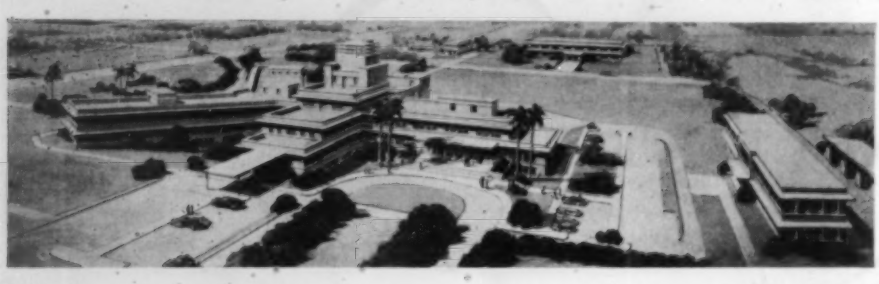
 (*Continued from page 166*)



Driscoll Foundation Hospital for Children, Corpus Christi, Tex. Designed by C. H. Page & Son, Architects. Consulting architects for the project are Eggers and Higgins

will include the construction of a new boiler house. Eggers and Higgins, of New York, are the architects.

Driscoll Hospital

Plans to construct the new Driscoll Foundation Hospital for Children in Corpus Christi, Tex., at an estimated cost of $2,250,000 have been announced. The hospital will serve children up to 16 years of age and will be the only hospital of its type in the Corpus Christi area. Designed without a cashier's window, the hospital's construction and cost of operation will be provided from funds left by the late Mrs. Clara Driscoll, of Corpus Christi.

The building is designed to accommodate 100 patients in the first project and to be expanded to 200 beds in the future. It is of two-story height and will contain five wings. Walls are of brick with stone trim. Windows are of aluminum. The building will be air-conditioned with the exception of minor service portions. Preliminary plans were drawn by Eggers & Higgins, architects, of New York, who are serving as consulting architects, and working drawings are now in process by C. H. Page & Sons, of Corpus Christi, architects for the project.

Printing Plant

The Neo-Gravure Printing Company, of Chicago, subsidiary of Cuneo Press, Inc. has awarded a contract to the Turner Construction Company for the erection of a $2 million plant at Weekhawken, N. J. Architects are De Cherrie & Berkenblit, of Chicago.

AT THE COLLEGES

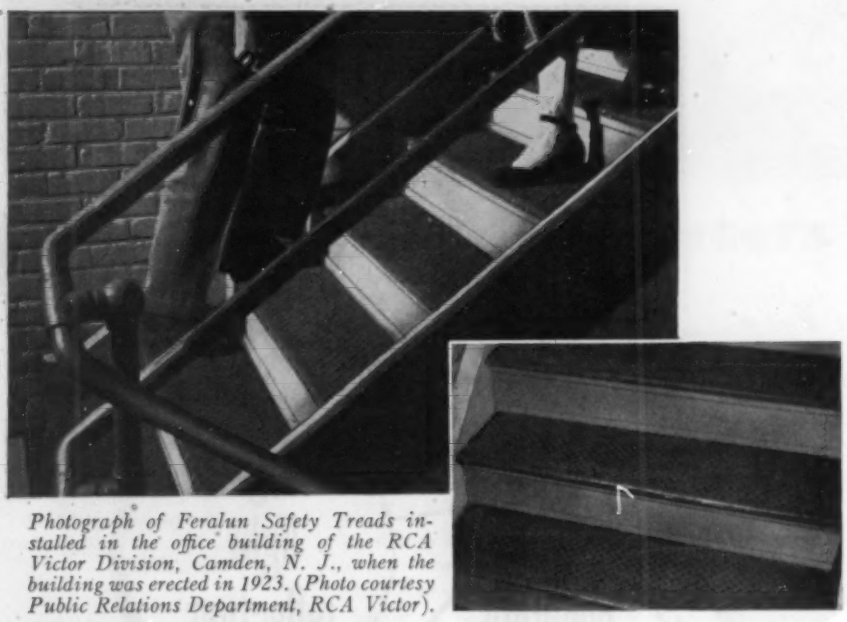
Fellowships

Fellowships amounting to $1000 a year have been established at both the University of Washington and Oregon State College by the Weyerhaeuser Timber Company. The grants will be for graduate research in the field of forest management. First recipients of the fellowships started work at the beginning of the academic year in September.

Curricula Inspected

Inspection committees have examined 481 curricula, including 112 new inspections, at 106 engineering colleges in the past two years, it has been revealed by H. T. Heald, president of the Illinois Institute of Technology and chairman of the Committee on Engineering Schools of the Engineers' Council for Professional Development.

(*Continued on page 170*)



Photograph of Feralun Safety Treads installed in the office building of the RCA Victor Division, Camden, N. J., when the building was erected in 1923. (Photo courtesy Public Relations Department, RCA Victor).

"INSTALLED IN *1923*... STILL GIVING SATISFACTORY SERVICE TODAY"

They planned well for safety and for durability—those who were responsible for these Feralun* safety treads—installed when this RCA Victor building was erected in 1923. A quarter century of resistance to wear under the many thousands of feet that have gone up and down them since Calvin Coolidge first entered the White House! A quarter century of underfoot safety, too, on Feralun's non-slip surface! And, as the photograph shows, these same treads can still be counted on for many more years of maintenance-free service—and safety.

Examples like this show why architects, engineers and builders insist on "Feralun" treads, nosings and plates. Made of cast iron with wear-resistant abrasive particles embedded in walking surfaces, "Feralun" provides a sure-footed "grip" that keeps feet from slipping—and wears and wears. The coupon below will bring you full information on "Feralun." Send it today.

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its uses and advantages

Where it is used Unit heating is widely used in industrial plants and warehouses, garages, stores and public buildings where the following advantages are important.

Low first cost Unit heaters are so efficient and so compact that their heating capacity is often equivalent to the capacity of cast iron radiation or pipe coils of twice the cost. Additional savings are effected because the system requires a proportionately smaller amount of pipe, fittings and accessories.

Economy of operation Heat is forced down to the working level . . . not banked uselessly at the ceiling level. Heat is turned on and off merely by throwing a switch either manually or automatically by simple thermostatic controls. The rapid response means that heat is furnished only when and where it is wanted . . . no heat is wasted.

Heating comfort Unit heaters provide quick heating from a cold start. Desired temperatures are easily maintained within a close range. Heat is uniformly distributed in the working zone by forced air circulation. It is a very flexible system because different or changing heating requirements are easily satisfied by means of different models, a range of capacities, single- or two-speed motors and individual thermostatic controls.

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Thermolier unit heaters have important construction advantages The design of Thermolier unit heaters is the product of Grinnell Company's ninety-nine years of heating experience. Both architects and contractors like Thermolier's durability, freedom from maintenance troubles and dependable operation. Typical of its construction features is the patented internal cooling leg which permits the use of a plain thermostatic trap, the simplest, least expensive kind of trap. For full details on Thermolier features, capacities and types, see your Sweet's Files.

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University of Illinois homes for 30 staff members. Project of Small Homes Council

Cabot's House Paints (Gloss Collopakes) provide extra beauty that lasts for extra years. That's because the patented Collopaking process reduces pure pigments to particles 100 to 1000 times as fine as in ordinary paints and disperses them evenly throughout the vehicle. Cabot's Collopakes are self-levelling . . . show no brush marks. And because no fillers or adulterants are used, their colors remain true, even after long exposure in the most testing climates.

Cabot's Collopakes are available in a wide variety of colors . . . many of them, like Longfellow Yellow and Haddam Barn Red, obtainable from no other source.

WRITE TODAY for color card and complete information.

A Distinctive Finish that Endures

Architects - Dubin & Dubin

Samuel Cabot, Inc.

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Illinois Staff Homes

Principles developed in housing and heating research studies at the University of Illinois are being applied in the construction of 30 homes for University staff members — newest project of the Small Homes Council.

The new homes are being constructed on modular design principles and employ also site-fabricated and truss methods. All are basementless on insulated slabs and the utility plans of kitchens and other areas meet research standards. Noteworthy is the site plan; neither houses nor major tree plantings follow or emphasize street lines. When trees attain full growth the effect will be that of a partially wooded site. All houses are one-story and are of three basic designs and sizes with variations in exterior appearance. Because other homes in the area are large they have been grouped in pairs for harmony in the neighborhood appearance. All have combined living-dining area with movable closet-walls employed in the larger homes.

Most of the houses have redwood siding, painted white and grey where horizontal siding is used and left natural with vertical siding. A few houses are finished with cement asbestos board panels. Interior walls are of gypsum wallboard which is being taped, textured and painted.

All interested campus units collaborated on the project which was planned and designed by the Small Homes Council. Skidmore, Owings and Merrill, architects, planned the site and cooperated on architectural work.

New Buildings

Albion College's new dormitory for men, Seaton Hall, has been officially opened for occupancy with accommodations for 234 men. The dormitory, gift of the Kresge Foundation, is the first unit in the men's dormitory system. It is a four-story fireproof structure of colonial design. All rooms are doubles. The building also contains a lounge and recreation room.

The first of three 10-story apartment buildings being constructed at the Illinois Institute of Technology, has been opened for occupancy. Gunsaulus Hall contains 116 units for housing of married students and staff members. This marks the first time that any housing has been provided for married students at the Institute. The $1,200,000 build-

(*Continued on page 172*)

FOLLANSBEE SEAMLESS TERNE ROLL ROOFING

FOR NEW ROOF CONSTRUCTION · ROOF REPLACEMENT · FLASHING AND WEATHERSEALING

AVAILABLE NOW, for the first time in many years, 40-lb. terne-coated* Follansbee Seamless Roll Roofing assures maximum roof protection for all types of structures. Time-proved as a durable roofing material, 40-lb. terne-coated steel* has set many performance records. In fact, 40-lb. terne roofs serving MORE THAN FIFTY TROUBLE-FREE YEARS may be found in many cities.

Furnished in 50-foot continuous rolls without cross-seams, this superior roofing metal can be readily applied regardless of architectural design characteristics. Write today for full information on specification and application details.

*Each 435 sq. ft. of copper-bearing steel base plate is hot-dip coated with 40 lbs. of tin and lead alloy (terne coating).

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FOLLANSBEE METAL WAREHOUSES—PITTSBURGH, PA., ROCHESTER, N. Y., and FAIRFIELD, CONN.

ing is part of Illinois Tech's long-range expansion program which, when the college's new modern campus is completed, will provide housing for 2000 persons in a total of three 10-story apartment buildings, 12 four-story dormitories, three three-story walk-ups and 24 row houses.

Faculty Appointments

James H. Acland, of Montreal, Quebec, has recently been appointed assistant professor of architecture at the University of Utah.

Charles Warner, Architect, and partner in the firm of Warner-Leeds, has been appointed critic in design at Pratt Institute.

Stanley Salzman, Architect, has been appointed instructor in graphics and design at Pratt Institute.

Seymour Howard, Architect, will teach construction courses at Pratt Institute.

Peter Blake, designer and curator of the department of architecture at the Museum of Modern Art, has been appointed an instructor in introduction to architecture courses at Pratt Institute.

Peter Grippe, sculptor and painter, will teach basic design at Pratt Institute.

Manuel Bromberg, formerly head of the art department of Salem College, has been appointed an associate professor of design at North Carolina State College.

Walter Weissman has been made an instructor in architecture at North Carolina State College.

Lee F. Hodgden has been appointed to the position of instructor at North Carolina State College.

Walter B. Sanders, A.I.A., of the firm of Sanders and Malsin in New York City, has been appointed to the position of professor of architecture at the University of Michigan.

Lyndon Welch has been made an instructor in architectural construction at the University of Michigan.

Knut Lonberg-Holm, graduate of the University of Copenhagen, Denmark, will be a visiting lecturer in architecture at the University of Michigan.

Roger G. J. Legrand, graduate of the École des Beaux Arts de Paris, will be a visiting lecturer in architecture at the University of Michigan.

Thomas F. McClure has been appointed an assistant professor of sculpture at the University of Michigan.

OFFICE NOTES

Offices Opened, Reopened

Architectonics, Inc., firm engaged in the practice of industrial design, announces the opening of a new office at 207 E. 37th St., New York 16, N. Y.

Miles Edwards Falls, Architect, has opened an office at 2208 Cedar Springs Ave., Dallas, Tex.

J. Paul Gilmore, Architect, formerly of Hudson, Gilmore, Campbell, announces the opening of offices at Farm Security Building, Montgomery, Ala.

Leonard H. Glasser, Architect, has opened an office for the practice of architecture at 835 Lincoln Rd., Miami Beach, Fla.

Lawrence Halprin, Landscape Architect, announces the opening of an office at 802 Montgomery St., San Francisco 11, Calif.

John C. Milne announces the opening of a showroom for decorators' require-

(*Continued on page 174*)

See why America's finest industrial laboratories are Kewaunee equipped

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METAL SCIENTIFIC
LABORATORY EQUIPMENT
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ments at 18 E. 53rd St., New York, N. Y.

Col. Paul L. Snyder, announces his separation from the United States Air Forces and the opening of an office for the practice of architecture at 404½ S. Tryon St., Charlotte 2, N. C.

Harry W. Terry, consulting engineer, of Scarsdale, N. Y., has opened a headquarters at 518 Fifth Ave., New York, N. Y.

Timbertone Decorative Co., Inc., announces the opening of new showrooms and offices at 114 E. 32nd St., New York, N. Y.

New Addresses

The following new addresses have been announced:

Campbell and Wong, A.I.A., 802 Montgomery, San Francisco 11, Calif.

Fromherz Engineers, 823½ Poydras St., New Orleans 13, La.

Victor Hornbein, Architect, 714 Pontiac St., Denver, Colo.

Francis Keally and Howard S. Patterson, Architects, 17 E. 49th St., New York 17, N. Y.

Konwiser Fabrics, Inc., 1 E. 53rd St., New York 22, N. Y.

Douglas Orr, Architect, 111 Whitney Ave., New Haven 10, Conn.

John Lyon Reid, A.I.A., of Bamberger and Reid, 109 Stevenson St., San Francisco, Calif.

Carl Schmuelling, A.I.A., Lexington Circle, Terrace Park, Ohio.

New Firms, Firm Changes

Hubert M. Garriott and John W. Becker announce their association as partners in the practice of architecture, under the firm name of Garriott and Becker, with offices at 800 Broadway, Cincinnati 2, Ohio. The association follows the dissolution of the firm of Garriott, Becker and Bettman.

Archibald Coleman Rogers, A.I.A., and Francis Tournier Taliaferro, A.I.A., have formed a partnership for the practice of architecture with offices at 49 College Ave., Annapolis, Md., and in the Ewing Bldg., Easton, Md.

ELECTIONS, APPOINTMENTS

The board of management of the Société Belge des Urbanistes et Architectes Modernistes, which was the originator of urbanization in Belgium, has recently been constituted as follows: president, P. A. Michel; vice president, J. F. Hoeben; secretary-general, J. Franssen; treasurer, P. Mornard, and counselors, G. Brunfaut, J. Moutschen, Paul Rubbers, E. Taelemans and J. Valcke.

Harold R. Sleeper, A.I.A., has been named chairman of the Architects Division for the 1949 fund drive of the Travelers Aid Society of New York. The campaign, now in progress, has set a goal of $350,000.

Beatrice West, decorator, has been appointed director of interior design and color coordination of the Rahr Color Clinic. Miss West has been employed as color coordinator and decorator for Levitt and Sons, Inc., home builders. She was previously with the Texas Housing Company, Dallas and also did the color styling for the Whiterock, N. M., housing project, suburb of Los Alamos, N. M.

Charles Frederick Wise, A.I.A., of Philadelphia, has been appointed consultant on construction advertising by Lee Ramsdell & Co., Inc., Philadelphia advertising agency.

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OUT OF EVERY $5
by using
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This roof plank combines so many functions in one material...all at one low installation cost...that **$4 does the work of $5** as compared with other materials. Note the 3-in-1 advantages of this light-weight, precast, factory-coated plank:

1 Fireproof, reinforced, cement-surfaced, and ready for application of the built-up roofing.

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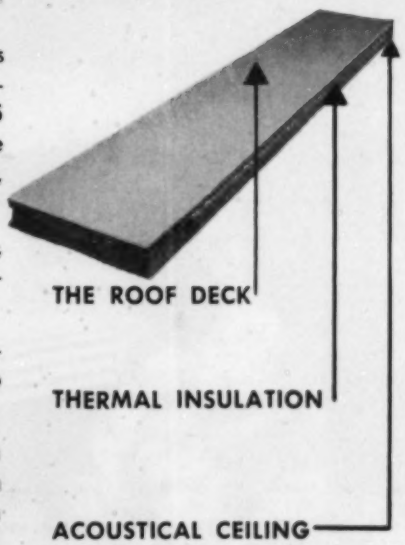

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Thickness	Width	Maximum Span	Weight per sq. ft.	Long Edge	Load
3¼"	16"	6'8"	15 lbs.	Tongue and Groove	250 lbs. per sq. ft. ultimate uniform load.
4¼"		8'	18 lbs.		

For complete information, write for folder (A.I.A. File Number 4-K). Also see catalog 3c/13a, Sweet's File Architectural, 1949.

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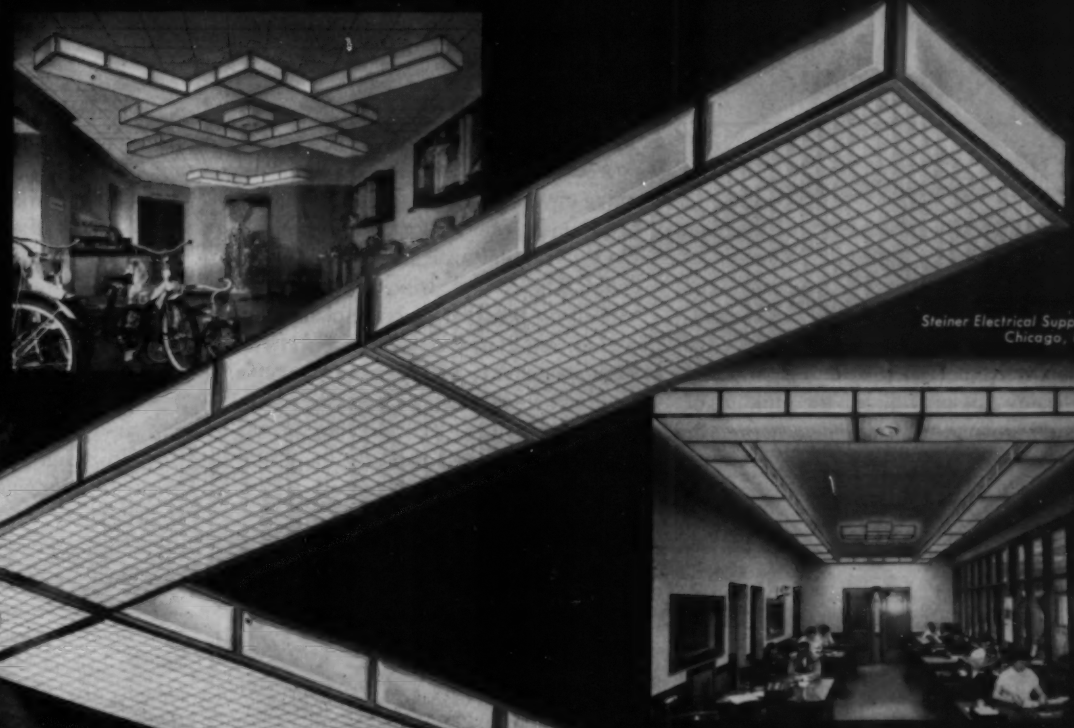

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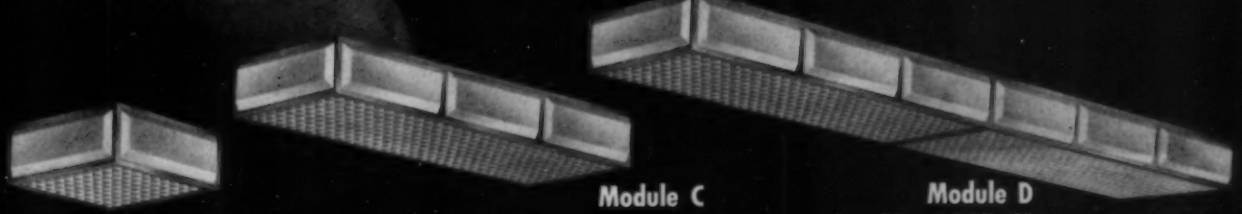
never before possible! custom-designed lighting installations at mass-production prices!

MODULE lighting is here... a truly revolutionary idea that heralds a dynamic new era in commercial lighting. Four low-cost "building blocks of light" easily fit together mechanically and electrically... end to side, end to center, end to end, or side to side. Now, you can economically fulfill specialized needs with an infinite variety of harmonious, functional lighting patterns that fit all architectural requirements. MODULE is truly *superior* lighting—providing an abundance of glare-free illumination with exceptionally low surface brightness. Ingeniously engineered plastic louvers and side panels provide scientifically correct shielding and eliminate unsightly dark spots.

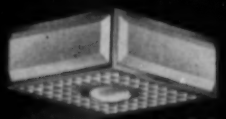
Write today for FREE 20-page MODULE booklet which fully explains and illustrates the unlimited possibilities of this modern lighting miracle.



Module A
Four 14-watt T-12
15" type F lamps

Module C
Four 40-watt T-12
48" type F lamps

Module D
Four 75-watt T-12 425
milliamp Slimline lamps



Module B
One 32-watt 12" Circline lamp, and one Par Spot or Floodlamp

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NEWS FROM CANADA *by John Caulfield Smith*

Housing Subsidies Get Nod

Canada's newly announced shelter policy reveals a change in Prime Minister St. Laurent's thinking. He once declared no government of which he was a member would ever subsidize housing. The proposed amendments to the National Housing Act provide for the building of rental projects "either on an economic or a subsidized basis."

Actually, the proposals fall into two categories. The first deals with prospective home owners. It makes it possible for them to get a bigger loan to buy or build. The second, which requires provincial cooperation to be implemented, assists small municipalities and those with inadequate revenues to assemble land and erect housing for sale or rent.

When passed — and in view of the government's parliamentary majority, there can be little doubt that it will be passed — the legislation will be administered by Central Mortgage & Housing Corporation. The Corporation may then make a direct loan to house buyers equal to one-sixth the amount of the loan made to operative builders. This means that the maximum loan obtainable under the National Housing Act will be raised from $8500 to $9900, cutting down payments by approximately one half. People contracting for new houses as well as those buying them from builders will benefit.

Aid to municipalities takes the form of loans for housing projects to be developed and managed under federal-provincial auspices. Three types of project are included: the clearing and servicing of housing sites, the construction of houses for sale and the building of rental housing. In each case, the cost will be shared 75 per cent by Ottawa and 25 per cent by the province. The annual profit or loss on any project is to be shared in the same way. All projects must be initiated by the province. Contrary to past practice, Ottawa will not deal directly with municipalities.

The present veterans' rental housing program is to be absorbed into the federal government's new arrangement with the provinces. In addition, the government recognizes that the municipalities in which veterans' projects are located are entitled to larger payments in lieu of taxes. Previously the amounts paid have been much less than the city or town would have received as the result of normal assessment.

Starting Salaries Upped

The 1949 crop of engineering and science graduates received an average starting salary of $2550 per year, according to an announcement by Hon. Humphrey Mitchell, Minister of Labor. A continued upward trend is revealed by comparing this sum with $2440 for graduates of 1948, $2350 for graduates of 1947 and $2150 for graduates of 1946. The figures were compiled from a study of 1000 individual cases.

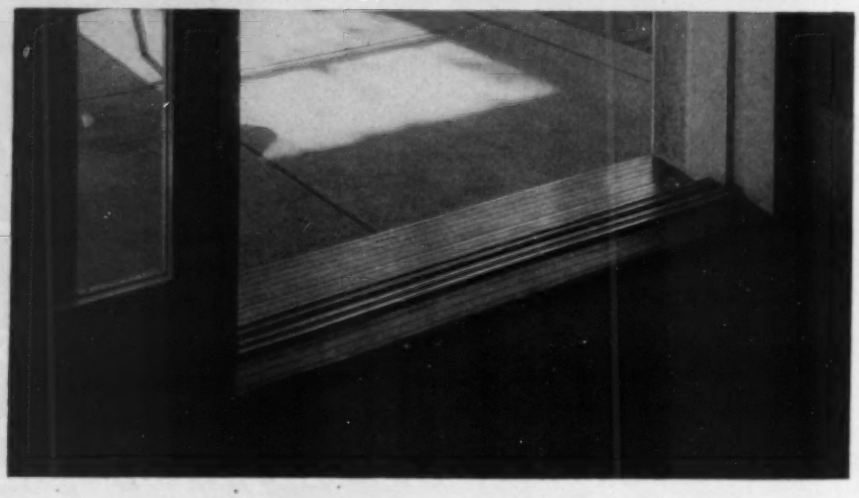
Second Mortgages Popular

The Ontario Government has set aside another $5 million to meet requests for second mortgage loans. This announcement was made by Hon. William Griersinger, Minister of Planning and Development.

From the original fund of $10 million, established over a year ago, loans totaling $9 million have been approved. The

(Continued on page 178)

WEATHER STRIPS FOR SLIDING DOORS



Everyone Wants Sliding Doors!

"ACCURATE" ASSURES OPERATING EFFICIENCY

Everywhere, more architects are specifying sliding doors to open on terraces, patios, balconies, porches. An unexcelled feature for clubhouses, finer residences, sanitaria and similar buildings. "Accurate" has played a major role in promoting the use of exterior sliding doors by assuring more efficient, smoother gliding operation, *plus wholly weatherproof qualities,* backed by numerous patents. 43 years' experience in making better metal weather stripping for windows and doors establishes "Accurate" as the pioneer manufacturer in this field.

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Life expectancy dictates JENKINS VALVES *for the new John Hancock Building*

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Builders: TURNER CONSTRUCTION CO., Boston, Mass.

Contractors for Heating, Ventilating, and Air Conditioning
BUERKEL & CO., INC., Boston, Mass.

FROM TELEVISION MAST to sidewalk snow-melting system, the new John Hancock Mutual Life Insurance Company Building has been skillfully planned for operating efficiency and economy, now, and in the years to come.

All equipment was chosen with an eye to the future—*future maintenance and operating costs.* It was on this basis that Jenkins Valves were selected.

Leading architects, engineers, and contractors have specified Jenkins Valves for the nation's most efficiently planned and operated buildings and plants for over 85 years. First, because they know that Jenkins builds extra endurance into valves—proved by long life and low upkeep cost records in every type of service. Second, because they know the value of the unequalled experience Jenkins Engineers can apply to any question of selection, installation, or maintenance.

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VALVES
SINCE 1864
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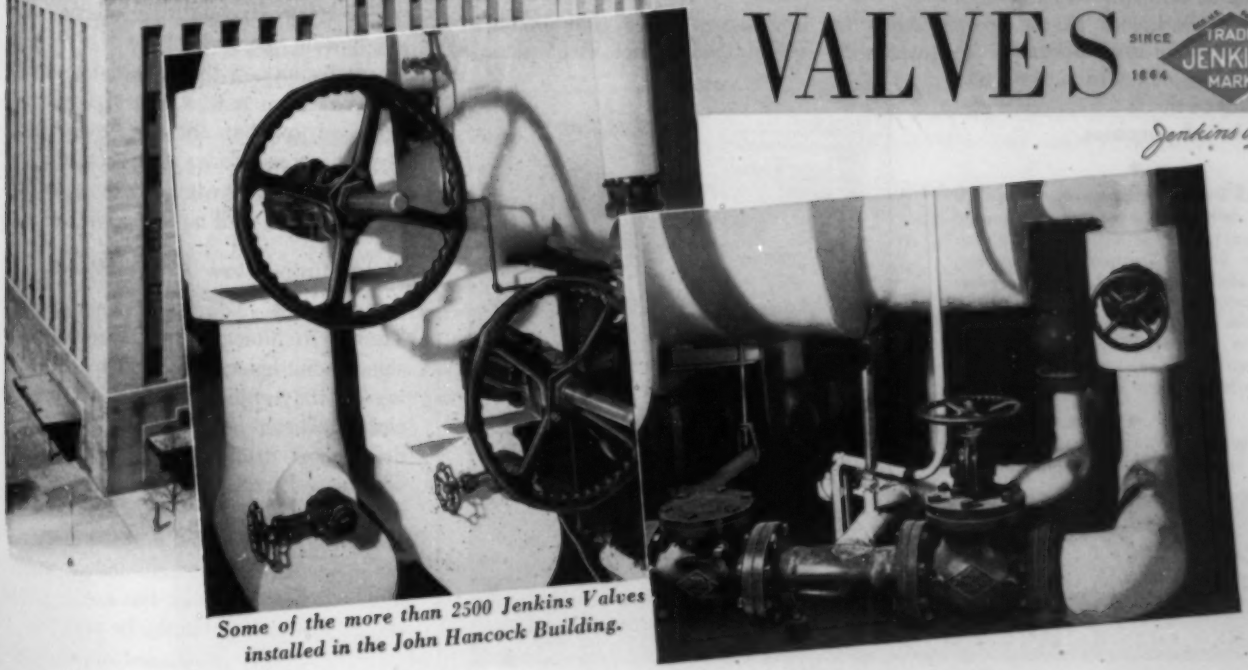
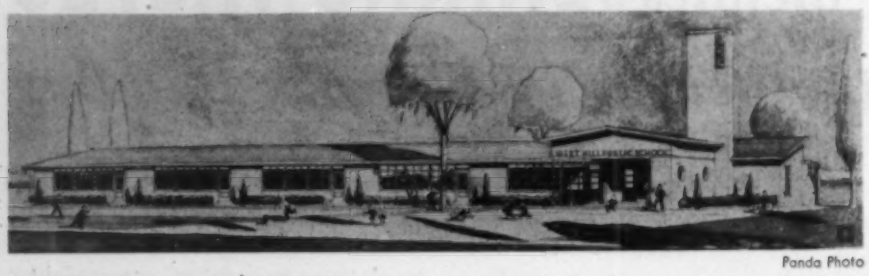


Some of the more than 2500 Jenkins Valves installed in the John Hancock Building.

NEWS FROM CANADA (*Continued from page 176*)



Panda Photo

West Hill Public School, Scarborough, Ont. By Murray Brown & Elton, Architects

Sedgwick

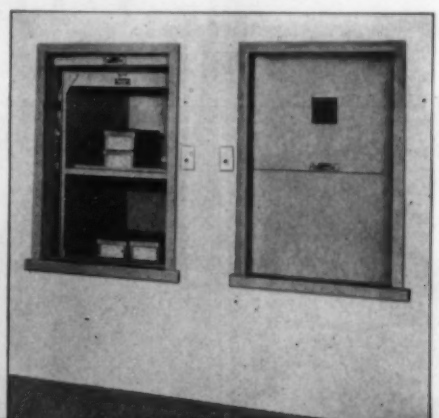
DUMB WAITER DOORS

—A Very Important "Assist" in Satisfactory Dumb Waiter Service

Dumb Waiter Doors are as important for efficient operation as is the selection of satisfactory dumb waiter units. Sedgwick Dumb Waiter Doors are of durable steel construction, have stainless steel sills and can be used with electric or hand power dumb waiters—or for protecting the landing openings of conveyors, laundry and package chutes and other types of floor-to-floor transportation equipment.

Available with approved Underwriters' Label where required, Sedgwick Dumb Waiter Doors are finished in appearance, easy of operation, sturdy and come in four general types, including bi-parting, slide-up, slide-down and hinged. Doors and frames are completely factory-assembled units, convenient for setting in place as hoistway walls are built.

Specify Sedgwick Dumb Waiter Doors for best performance and ultimate economy. They are backed by Sedgwick's 55-year-old experience in planning, engineering, manufacturing and installing of dumb waiters and elevators for all purposes.



Sedgwick Dumb Waiters are available for prompt delivery in a variety of standard sizes and types. The Electric Roto-Waiter and the Electric Traction Dumb Waiter, with capacities up to 500 lbs., are leaders in the power-controlled field. Hand operated units of unusual merit and ease of operation are designed for many uses where less expensive equipment is desired, or when frequency of use is less.

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maximum loan offered on any house is $1250 (or one half the down payment) repayable in monthly amounts over a 20-year period with interest at 3½ per cent. On August 1, the province reduced its cost limitation on houses eligible for second mortgage financing from $15,000 to $12,000.

1949 Holds Lead Over 1948

According to Maclean Building Reports, construction is up on the year, down on the month. Contracts for the first eight months totalled $708 million or $44 million more than the same period in 1948. Awards for August, however, were $1 million less than a year ago.

Housing accounted for more than two-thirds of the August total, the loss on the month being recorded in other classifications. Comparative figures, in million dollars, are:

	1949	1948
Residential	55.9	44.4
Business	24.6	29.8
Industrial	2.7	5.6
Engineering	7.3	11.6

More Bedrooms Called For

The two-bedroom bungalow may be all right as a mortgage risk, but it is far from being satisfactory as a home. That, at least, is the opinion of Toronto's Neighborhood Workers' Association. In its annual report the Association refers to this type of dwelling as being little more than a form of birth control. "There is implied a definite limitation of the family to two children. Two-children families mean a community that is slowly dying."

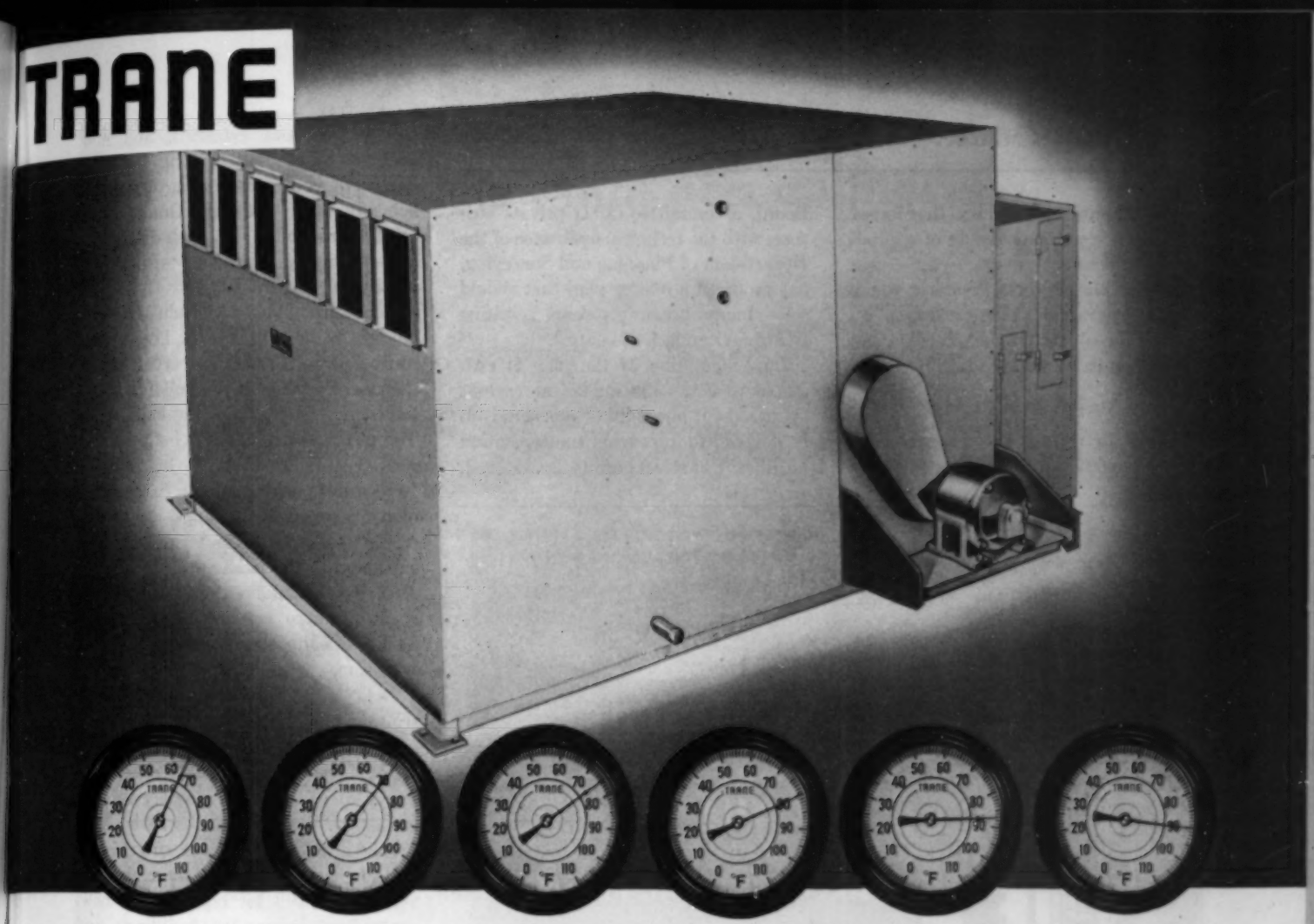
The report goes on to urge intelligent subdivision planning. "We should not be producing now the potential slums of 25 years from now. Control should be exercised so that the hopelessly ugly and monotonous rows of houses which a contractor's bad dream sometimes brings into existence shall not be permitted."

Streamlining Now A Cliché?

Gordon S. Adamson, well-known Toronto architect, includes product design among his varied interests. Speaking on the subject at a recent service club luncheon he stated that today's designer is often under pressure "to design and redesign with an eye to quick sales." He becomes a streamliner or stylist. Streamlining may be justified to cut down wind resistance of automobiles and aeroplanes, but not in such things as kitchen utensils, he said.

(*Continued on page 180*)

TRANE



Six kinds of weather at the same time —from the same unit!

On installations where sun, wind or other factors combine to create a variety of different air conditioning demands in a building simultaneously, zoning is usually desirable.

Large work can frequently be handled to best advantage with a separate Climate Changer for each zone. For applications of medium or comparatively small size, however, Trane Multizone Climate Changers have important advantages.

With this new unit any number of zones, two through six, are under individual zone temperature control. A 25-degree variation between warm and cool is secured when needed.

The unit has thermostatically controlled dampers which determine the amount of warm air or cool air to be delivered from each outlet. Any mixture may be used, and reheating is accomplished automatically.

In this way, one Multizone Climate Changer—with one heating coil, one cooling coil, and one motor—produces results which might otherwise require as many as six individual air conditioning units.

Ask the Trane sales office in your area to show you how Climate Changers are being used to meet heating, ventilating and air conditioning needs, for comfort or process work, domestic, commercial, industrial. There is a size, style, and type that will meet your needs.

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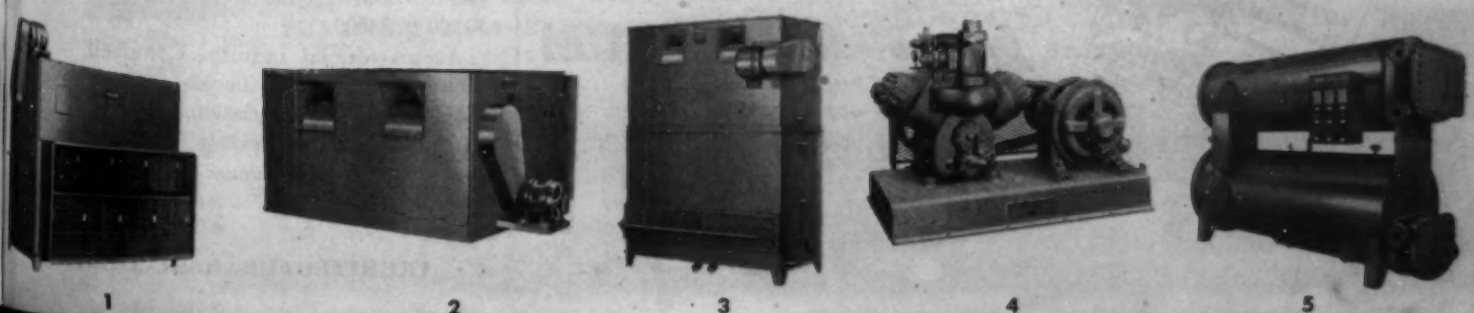
An endless variety of sizes and styles of Climate Changers, vertical (1) and horizontal (2); along with Evaporative Condensers (3); Compressor Units (4); and Turbo-vacuum Compressors (5); are typical of the broad Trane line.



1 2 3 4 5

 (*Continued from page 178*)

Mr. Adamson pointed out that forced obsolescence — the changing of a product's appearance every year — was characteristic of North America, where there were ample raw materials. In Europe the supply was not so great, and things had to be made to last.

Toronto Master Plan Ready

Toronto's growth has been charted for the next 30 years. The City Planning Board, a committee of six private citizens, with the technical assistance of the Department of Planning and Surveying, has prepared a master plan that should solve many urban problems resulting from previous lack of control.

Implementation of the plan is estimated to cost $180 million at current prices. About one-third of this sum is to be devoted to improving transportation facilities. Old streets are to be widened, straightened and extended, and new ones are to be built. Among the most important is a cross-town artery paralleling the shores of Lake Ontario. Another thoroughfare will slash diagonally across the city to connect with a new north-bound highway.

Reconstruction of certain blighted areas is to be undertaken. These areas consist of residential properties where the assessed value of the building is less than twice the value of the land. Since Toronto is nearly entirely built-up, the cleared sites are likely to be used for large-scale housing projects. In addition, many new civic buildings are to be erected and there will be considerable expansion of the public utilities system. Actually the amount of money to be spent on improving water and sewerage facilities is almost as much as on transportation.

Next on the list of proposals are those relating to parks and open spaces, especially recreation grounds. Toronto's islands, hitherto inaccessible except by ferryboat, are to become a play area for the entire city. A tunnel will be built for the benefit of motorists and existing summer cottage and commercial developments will be replaced by new, centralized apartment buildings and hotels.

Toronto's plan is the seventh in the last 40 years to be presented to the people of the city. Earlier plans failed to win acceptance, sometimes because of the opposition of affected interests, on other occasions on account of their cost. Mayor Hiram E. MacCallum states that the new plan should not constitute too heavy a financial burden for the taxpayers. He points out that if it is not adopted they will pay in other ways. For instance, delays in moving commodities within the city will increase prices unless necessary street improvements are made.

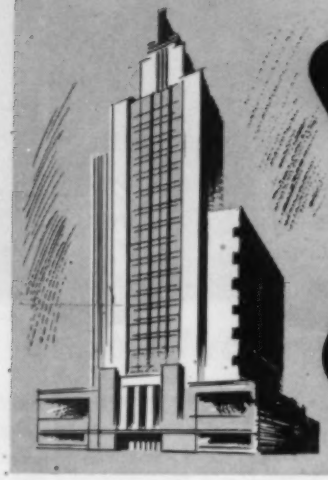
Builders Demand Licensing

The campaign for provincial licensing and supervision of builders has been renewed by the National House Builders' Association through its Toronto branch. Excuse is the recent default of the Kershaw Construction Company — Toronto's biggest postwar building "bust" — which threatens 48 investors with the loss of down payments ranging from $1500 to $3000.

At an official inquiry, Campbell Holmes, president of the Metropolitan Home Builders' Association, declared, "In times like these, every Tom, Dick

(*Continued on page 182*)

Remember this dependable source of supply



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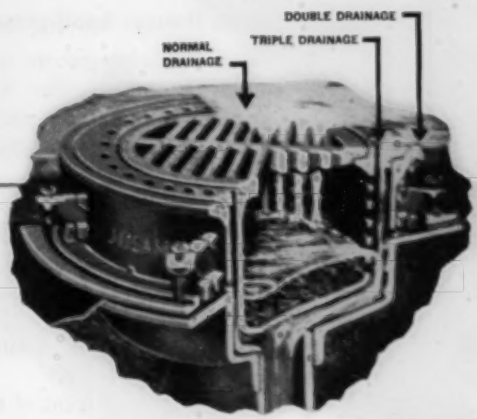

Josam Non-Clog Triple Drainage Drains

One of the many Josam exclusive developments. Designed to prevent drain lines from becoming clogged with debris by providing continuous drainage of debris-laden water. If sediment container becomes filled, drainage continues through holes in auxiliary rim, signalling need for cleaning. The grate cannot be set in place unless bucket is in position—a guarantee that bucket will not be omitted or thrown away.

Josam

...has the widest range of types and sizes of plumbing drainage products in the world!

...is specified by more architects and has its products installed in more buildings than all other makes combined.

There's a reason why these two facts solve any plumbing drainage problem. It means that Josam Products have been proved easier-to-install, better-in-performance, longer-lasting, and therefore can be depended upon *without reservation* to serve for the life of the building.

For example, the Josam Non-Clog Triple-Drainage Drain is one of many hundreds developed by Josam—the Standard of the Industry. When the problem is drainage, don't take chances—specify Josam—and put proven experience to work for you! Use convenient coupon below for quick action.

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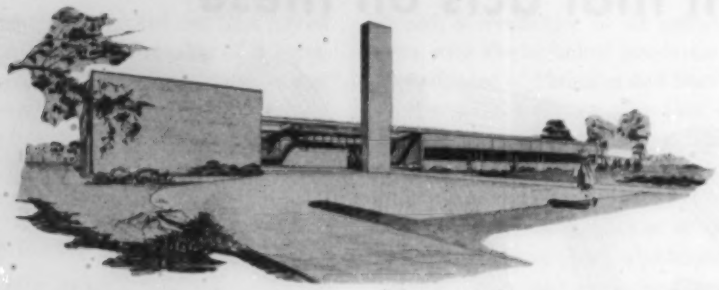
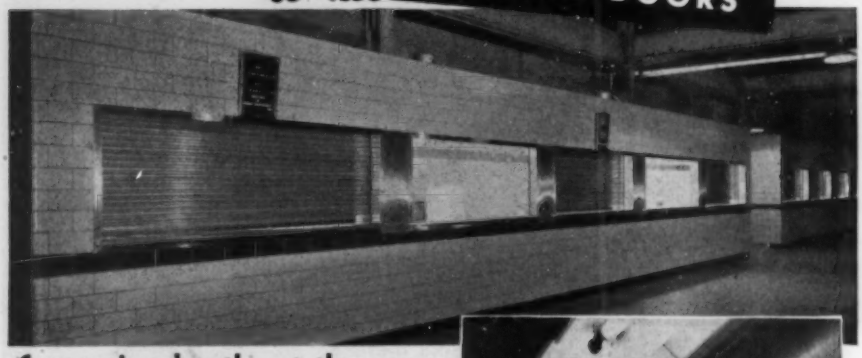
NEWS FROM CANADA (*Continued from page 180*)



Proposed public school, Tillsonburg, Ont. Designed by John B. Parkin Associates

Another practical way to use KINNEAR ROLLING DOORS

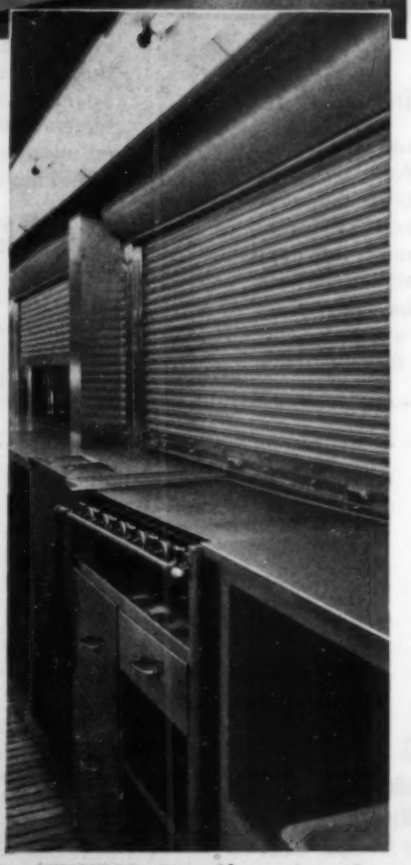


Concession booths at the new Cincinnati Arena protected with Kinnear ALUMINUM Rolling Doors

You have a doubly effective answer to many special types of closure problems—in addition to all regular service-door needs—in the coiling upward action of Kinnear Rolling Doors. The clean-cut beauty of Kinnear's all-metal, interlocking-slat curtains harmonizes with almost any architectural style. There's high efficiency in their smooth, vertical action. They clear the entire opening in one direct, time-saving motion. You don't have to provide any "reserve space"—in floor, wall, or ceiling clearances—for opening and closing action.

In addition, the all-metal construction of Kinnear Rolling Doors provides extra protection against intrusion, vandalism, storm damage, and fire. These combined advantages have made Kinnear Rolling Doors the logical choice for a wide range of special opening needs, such as the concession-booth installation above. Large removable partitions may be formed by two or more Kinnear Rolling Doors separated by center mullions that swing upward, out of the way. We'll be glad to supply full information on Kinnear solutions to any such problems you may encounter.

Built of aluminum, steel, or other metals, in several slat styles, they are available in any size, for old or new construction.



Saving Ways in Doorways
KINNEAR ROLLING DOORS

The KINNEAR Manufacturing Co.
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and Harry jumps into the building business, whether he has financial backing or experience or not. In every case where there has been a failure in the Toronto area, it was due to lack of experience in the business."

President Holmes and the Association favor adoption of a system similar to the one in force in Michigan. The state has a licensing act, a commission to administer it, requires registration of all residential contractors, technical examinations, evidence of competence and fair dealing, and provides penalties, including suspension. It is reported that three-quarters of the complaints received are satisfactorily adjusted out of court.

Prefab Houses Spotlighted

House-hungry visitors to the 1949 edition of the Canadian National Exhibition, Toronto, had their appetites whetted by the manufacturers of factory-built shelter.

The display took the form of a model village. Among the standouts was the Halliday Company's "Scot," a six-room, two-story Colonial job measuring 26 by 24 ft. Offered at $2500, its completed price — exclusive of finished attic — was estimated at $5500.

The big selling point of this house is its adaptability. The attic, which contains two of the six rooms, can be finished for an extra $500. A garage and breezeway can be added on one side for another $700. A two-bedroom wing for the other side is priced at $2000.

House Production Spurts

The number of dwelling units completed in the first six months of this year was 30 per cent higher than for the same period in 1948. Starts were only slightly ahead. Here are the figures to the end of June, as supplied by the Dominion Bureau of Statistics:

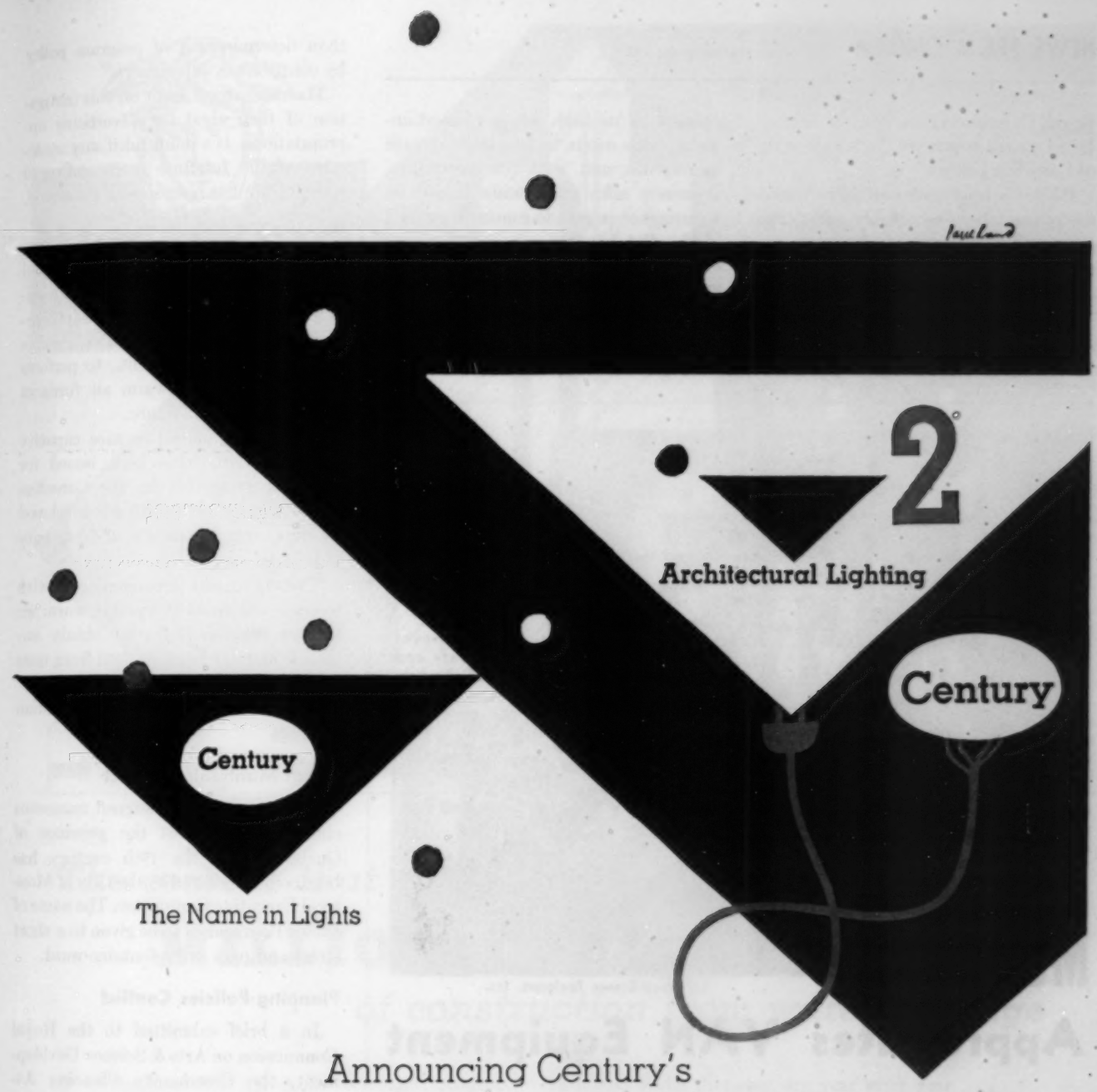
	1949	1948
Completions	39,726	30,528
Starts	40,199	39,768

The length of time required to build a house completed in June averaged 7.4 months. Though greater than last year at this time, the figure represents the seasonal construction speed-up.

Architects Stick Necks Out

A delegation from the Royal Architectural Institute of Canada, consisting of president A. J. Hazelgrove, Forsey Page, E. R. Arthur and J. Roxburgh Smith, has presented a brief to the

(*Continued on page 184*)



Announcing Century's New **Architectural Lighting Catalogue**

Century's new Catalogue (part 2) offers the results of wide and comprehensive study in Architectural lighting developments and techniques.

Completing **Century's** 20th year of experience in the design and precision engineering of scientific lighting for stores, showrooms, museums, churches, universities, auditoriums, window displays, hotels, night clubs, terminals, places of entertainment and all architectural purposes.

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Century Lighting Inc., 419 West 55th Street, New York 19, N. Y.
626 North Robertson Blvd., Los Angeles 46, Calif.

 (*Continued from page 182*)

Royal Commission on Arts & Science Development now investigating the state of Canadian culture.

While the brief made certain pertinent recommendations — notably that the government assist in recording and preserving examples of early Canadian architecture — it wandered far afield on the subject of radio. This, "the greatest and most universal instrument of education," has become in the architects' opinion, a medium whose "entertainment value caters to less than average intelligence, and, with few exceptions, is merely sales propaganda tagged on to nonsense or pseudo-romantic drivel."

The R.A.I.C.'s remedy would be to eliminate programs "which impose standards based on appeal to the non-intelligent." This could be accomplished by putting cultural leaders of the country in firm control of radio, "rather than determination of program policy by contributory advertisers."

The newspapers leapt on this castigation of their rival for advertising appropriations. It's doubtful if any statement of the Institute in its entire 40 years of life has been so well publicized.

Warm Air Research Started

The Canadian Chapter of the National Warm Air Heating and Air Conditioning Association announces that arrangements have been completed with Queen's University, Kingston, Ont., to perform physical testing on warm air furnaces of Canadian manufacture.

Up til now, official furnace capacity ratings in Btu have been issued for consumer protection by the Canadian Chapter based on equations developed by the parent association at University of Illinois.

"Newly made arrangements with Queen's will enable Canadian warm air furnace manufacturers to obtain authentic and independent data from tests made right in their own backyard," states C. B. Taylor of the Canadian Chapter.

Honor Montreal Architect

An architect who designed numerous churches throughout the province of Quebec during the 19th century has been commemorated by the City of Montreal Executive Committee. The name of Victor Bourgeau is to be given to a short street and park in Prefontaine ward.

Planning Policies Conflict

In a brief submitted to the Royal Commission on Arts & Science Development, the Community Planning Association of Canada discloses planning policy clashes within the federal government and between it and provincial and municipal governments.

The Association calls for clearing-house powers to be assigned to the public projects branch of the Reconstruction Department. The branch, which now deals only with employment aspects of the building industry, would be empowered to coordinate all federal planning policies with those of provincial and municipal administrations.

Such an arrangement would eliminate clashes like the one in which Central Mortgage & Housing Corporation put up a veterans' housing project in Vancouver directly across the proposed western terminus of the Trans-Canada Highway, leaving the federal government with the choice of either tearing down the houses or re-routing the highway.

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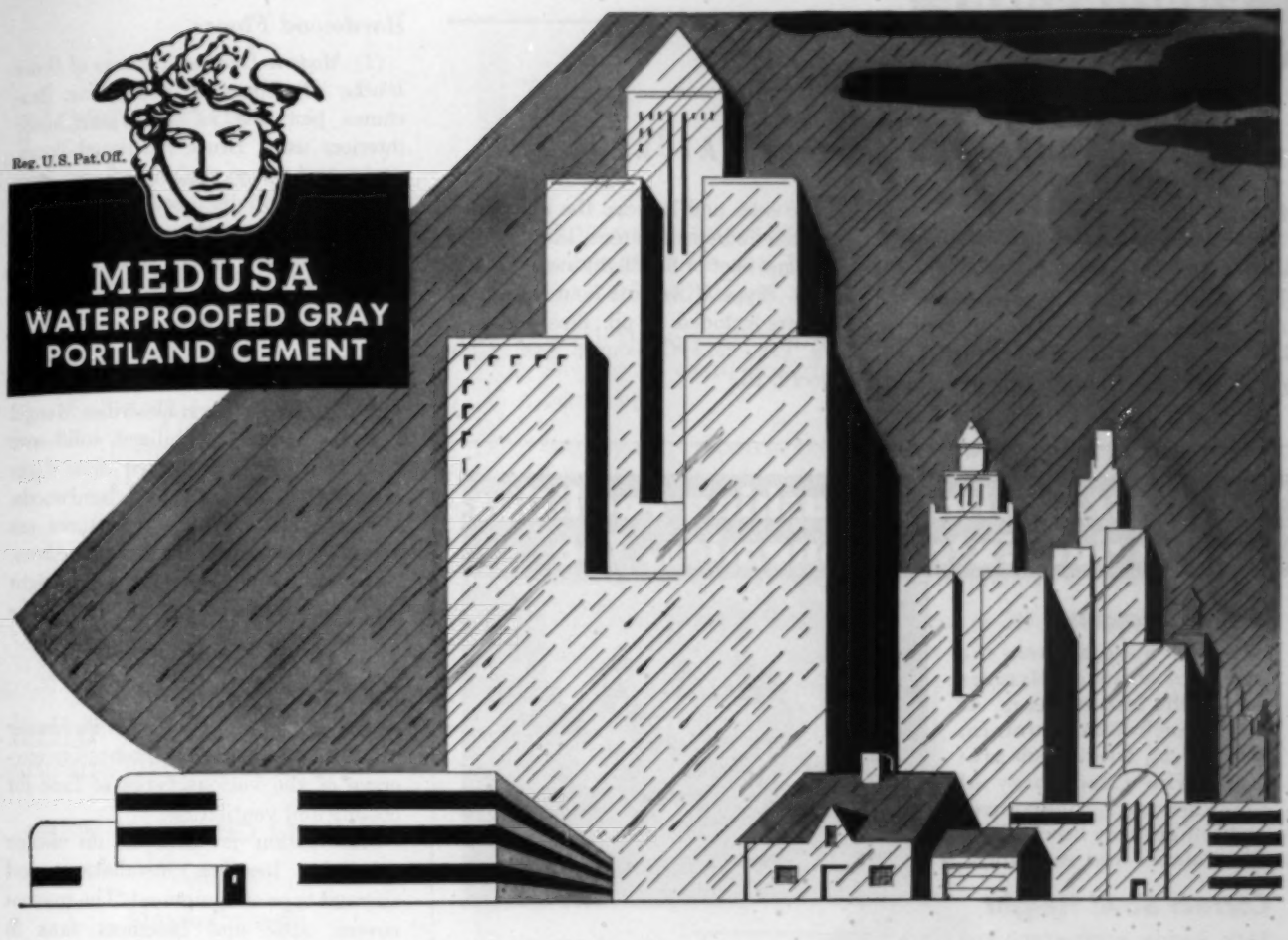

The cement that has saved

MILLIONS OF DOLLARS

of construction from water damage

● In the year 1907 Dr. S. B. Newberry, pioneer cement scientist, developed and patented a remarkable compound that led to the birth of Medusa Waterproofed Gray Portland Cement. Since that memorial year in the cement industry, buildings, homes, and other types of construction using this cement have withstood hurricane and torrential-like rains, *saving America millions of dollars of construction* . . . while other concrete construction succumbed to the destructive force of water.

Even today structures are built without ample protection against water damage. Specifying Medusa Waterproofed Gray Portland Cement for concrete and mortar insures your client that water will not deteriorate his concrete and mortar. For the capillaries in the concrete become lined with a water-repelling material . . . preventing capillary action from drawing water into the mass. Builders approve of Medusa Waterproofed Gray . . . mixed like any cement, it requires no extra labor.

Specify Medusa Waterproofed Gray* for every inch of concrete or mortar that needs protection . . . for floors and walls that stay dry year after year . . . for concrete, brick, and stucco homes with damp-free interior walls . . . for stucco free of disfiguring cracks and stains. The additional cost is trifling, but a fraction of the cost of repairing water damage! To answer your questions about water problems, Medusa has prepared two handy references. Mail coupon for complimentary copies.

*When not available, use Medusa Waterproofing Powder or Paste

FIFTY-SEVEN YEARS OF CONCRETE PROGRESS

MAIL THIS COUPON NOW!

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PORTLAND CEMENT CO.

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Gentlemen: Please send me copies of the free booklets "How to Waterproof Concrete, Stucco, and Masonry" and "A Discussion on Integral Waterproofing."

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Address .....

City ..... *State* .....

MANUFACTURERS' LITERATURE

Module Lighting

Mitchell Module Lighting System. Booklet on four new lighting units which combine in any desired pattern to form what is described as the equivalent of a custom-designed lighting system. Using a 16¼ in. module and plastic sides and louvers, the units may combine fluorescent lamps, slimline, circline, and spot or floodlight incandescent lamps. Typical layouts and specifications are included. 20 pp., illus. Mitchell Mfg. Co., 2525 Clybourne Ave., Chicago 14, Ill.

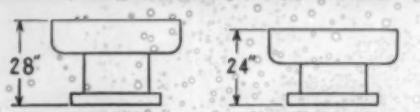
The Most Sanitary Washing Facilities Provide Extra Economies, Too

Group Washing

Bradleys have become the standard washing fixtures during the last 30 years. At the 54-inch Washfountain, 8 to 10 can wash, each provided with clean spray of running water. Foot-control and self-flushing bowl add to convenience and sanitation.

Correct Bowl Height

Face, hands, arms—even complete body to waist, can be washed as bowl is placed at 28" above ground. For juveniles as in schools or institutions, bowl is placed on shorter pedestal.



Savings

Water use reduced 70%. Only a bit more water is required for a group at a Bradley than for conventional "single-person" basin.
Only 3 Piping Connections to install for a group Washfountain as compared to 24 to 30 if same number (8 to 10) are served by "single-person" basins.
Less Janitor Time—no faucets—less piping maintenance.
Less Space Required.

A Choice of Types and Models

Bradleys are available in pre-cast stone, enameled iron and stainless steel—in full-circle 54" and 36" diameters and in semi-circular shape for mounting at wall.

Full-Circle 54" and 36" Diam.

Semi-Circular (Wall) 54" and 36" Diam.

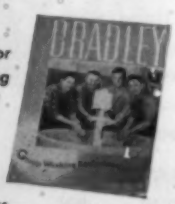
And Duos—for your smaller washrooms

Foot-control, no faucets to touch or repair, no water waste—the maximum in sanitation.

When considering new, enlarged or remodeled washrooms—we can give you practical helpful suggestions. BRADLEY WASHFOUNTAIN CO., 2227 W. Michigan Street, Milwaukee 1, Wisconsin.

BRADLEY Washfountains
Sold Through Plumbing Wholesalers

Write for Catalog 4701



Hardwood Floors

(*1*) *Modern Hardwood Floors of Bruce Blocks;* (*2*) *Yours for a Lifetime.* Brochures picturing in color nine house interiors using Bruce hardwood floors. Style, endurance, upkeep, installation and finishes are discussed. Data is given on the species, grades, and sizes available in Bruce block, plank or strip flooring. 6 pp. each, illus. E. L. Bruce Co., Memphis, Tenn.*

Flush Doors

Mengel Flush Doors. Describes Mengel hollow-core and stabilized solid-core flush doors with veneered door faces available in a variety of hardwoods. Design and construction features are presented with drawings. Specifications, notes on usage, and size and weight tables are included. 8 pp., illus. The Mengel Co., Louisville 1, Ky.*

Cooling Fans

How to Cool For Comfort With Hunter Fans. Manual gives comprehensive coverage of the various types of fans for cooling and ventilating.

Information is included on design principles, location, installation, and size and type of equipment. The manual covers: attic and basement fans in residences; commercial ventilation and cooling; industrial ventilation and spot cooling.

The text is supplemented by many tables, details and diagrams. A technical section gives dimensions and performance data. 32 pp., illus. Hunter Fan and Ventilating Co., Inc., P.O. Drawer 2858, Memphis 2, Tenn.*

Classroom Planning

The Co-ordinated Classroom. Monograph prepared by Dr. Darell Boyd Harmon on classroom planning. Seating, posture, lighting, decoration, equipment, and visual problems are covered, with illustrations and charts showing varied effects of these on pupils. Data was chiefly drawn from studies made in the Texas State Dept. of Health. 48 pp., illus. American Seating Co., 9th & Broadway, Grand Rapids 2, Mich.*

Glare Reducing Glass

Blue Ridge Aklo Glass. Folder describes properties and advantages of Aklo Glass used for "filtered daylight" in industrial buildings. The glass is a soft blue-green and comes in frosted, clear and hammered styles, wired or

* Other product information in Sweet's File, 1949

(Continued on page 188)

plastering by the acre . . .

Approximately 35 acres of Fireproofing Plaster applied by

MUIR BROTHERS COMPANY
7 Spring Street
Boston 19, Mass.
Est. 1893

lime for masonry on this structure manufactured by

NEW ENGLAND LIME CO.
Adams
Massachusetts

Approximately 4000 tons of Caspro Vermiculite Plaster were used on the John Hancock Building saving a dead load of 8000 tons.

80,000 bags of Vermiculite fill were used on the floors, saving in dead weight of 27,000,000 lbs. over ordinary concrete.

Stucoustic Acoustical Plaster was used in corridors, lobbies and auditorium — 36,000 sq. ft. used.

California Stucco Products of N.E., Inc.

169 Waverly Street, Cambridge 39, Massachusetts

JOHN HANCOCK MUTUAL LIFE INSURANCE COMPANY BUILDING
Boston, Mass.
Cram and Ferguson, Architects
Turner Construction Company, Builders

(*Continued from page 186*)

unwired. Pictures and diagrams illustrate typical installations and heat exclusion properties. 8 pp., illus. Libby-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, Ohio.*

Lighting Units

(*1*) *New Designs in Accentlights*, (*2*) *General Lighting Company Catalog 649*. Standard forms and uses of *Accentlights*, various recessed units, and ceiling louvers are presented in these catalogs. A variety of mountings and color finishes are described. Photographs, details and lamp data are included. 8 pp., each, illus. General Lighting Co., Inc., 1527 Charlotte St., New York 60, N. Y.*

Ceramic Tile

(*1*) *The Petroff-Clarkson Study*, (*2*) *Mosaic Tile in the Petroff-Clarkson Study*, (*3*) *Radiant Heating in the Petroff-Clarkson Study*. Folders present uses for ceramic tile in a living-dining room study by architects Petroff and Clarkson. Plans and drawings of the room are combined with a description of the radiant heating system and details of tiling on floors, walls, fireplace and benches. 4 pp., each, illus. The Mosaic Tile Co., Zanesville, Ohio.*

Air Conditioners

G. E. Packaged Air Conditioners (*Bulletins PM 79-0101, PM 79-0201, PM 79-0301, PM 79-0401*). Series of bulletins describes and pictures air conditioning units and gives specifications, ratings and dimensions. The first presents a 2 hp. unit for smaller applications including houses, offices and small stores. Bulletin PM 79-0201 describes a 3-hp. unit designed for stores, restaurants, hotels, offices and laboratories. A 5-hp. unit for similar applications is featured in the third bulletin. The last covers two conditioners with 7½ hp. and 10 hp. for large capacity jobs. 4 pp., 4 pp., 4 pp., 8 pp., illus. General Electric, Air Conditioning Dept., Bloomfield, N. J.*

Laminated Arches

Rilco Glue Laminated Wood Arches and Trusses. Describes uses and advantages of several types of laminated fir structural members. These include clear span arches, church arches, utility arches, bowstring trusses, tied arches, flat beams and columns. Specifications, dimension tables, details and photographs of the various types are given. 12 pp., illus. Rilco Laminated Products, Inc., First National Bank Building, St. Paul 1, Minn.

Radiant Heating

Radiant Heating — simplified Design and Installation. Brochure presents a simple method of designing low-temperature radiant panel heating systems using copper tubing and suggestions for their installation. Plates show typical ceiling, wall and floor panel plans. A step-by-step design procedure is given, along with notes on fabricating, installing and testing the system. Illustrations of various types of installations and a number of data tables are provided. 20 pp., illus. Copper & Brass Research Assoc., 420 Lexington Ave., New York 17, N. Y.

Water Conditioning

Elgin Water Conditioning (*Bulletin 610*). Discusses benefits of water conditioning equipment, including water

(*Continued on page 208*)

Amtico
RUBBER FLOORING
is flame-resistant

it's also
BEAUTIFUL
COMFORTABLE
SOUND-DEADENING
EASY TO MAINTAIN
LONG-WEARING, OUTLASTING EVEN MARBLE!

A request on your business letterhead will bring illustrated literature and a box of 4"x 4" samples, standard ⅛" gauge, all 22 stock colors.

Name _____ Address _____

City _____ State _____

Also see SWEET'S FILE, Architectural, Code No. 13e

AMERICAN TILE & RUBBER COMPANY • TRENTON 2, N. J.
Specializing in the Manufacture of Rubber Flooring Exclusively for Over 30 Years

NOT MUCH that meets the eye. You'll have to look close to see the ferrous metal combination storm and screen windows and doors. You'll have to read on to learn what's new about them.

Spring . . . push up the storm window, pull down the screen. Nothing to change or store. *Summer* . . . pull down the inner window for draft-free ventilation. Go away knowing it *can't* rain in. *Fall* . . . push up the screen. Still nothing to store. *Winter* . . . pull down the storm window for snug-as-a-bug warmth. *Any time* . . . inserts come out from *inside* for *easy* cleaning.

New also is the fact that these combination windows and doors are now made of Armco Ingot Iron ZINCGRIP. This special metal offers home owners *everywhere* a product with excellent resistance to corrosive atmospheres—one that will not warp or shrink, rot or abrade—and that can easily be painted any color.

For more than 40 years galvanized Armco Ingot Iron has been specified by architects because of its exceptional record of service. Now the special ZINCGRIP coating offers additional insurance of long life. It does not peel or flake when the base metal is severely formed into products and it has greater resistance to atmospheric corrosion than equal-weight coatings on regular galvanized sheet metal.

Armco Ingot Iron ZINCGRIP is also recommended for gutters, downspouts, standing seam roofing, ventilators, metal awnings, and other building uses. Specify it for any application that requires the protection of an unbroken zinc coating. See your SWEET'S CATALOG for additional information—or write to Armco Steel Corporation, 4089 Curtis Street, Middletown, Ohio. Export: The Armco International Corporation.

ARMCO STEEL CORPORATION

ARMCO

(Continued from page 153)

SOUND DISTRIBUTION

For schools, colleges and other institutions, a new two-channel console (SS-271A) embodies in a single unit provision for communication, radio distribution, phonograph distribution, voice reinforcement, announcements and time signals.

The *Teletalk* has one channel for AM-FM radio reception and phonograph recording and another for general announcements and voice reinforcement plus the use of a separate phonograph reproducer if desired.

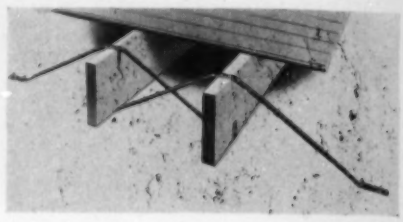
As many as 60 room selector switches may be used, and calls may be made to individual rooms without interfering with program distribution to other rooms. Arrangements may also be made for call-in from individual rooms to the central control console.

An "all-call" switch permits announcement to all rooms simultaneously. Webster Electric Co., Racine, Wis.

STEEL BRIDGING

Tru-Tye steel bridging for reinforcing wood joists of any standard depth installed on 16-in. centers comes in one stock size ready to use without cutting or fitting.

Rust-proofed and ribbed for extra strength, the steel pieces are installed in three simple steps, with only two nails required for each bridge.



Steel bridging reinforces wood joists

Before the flooring is laid, the bridging is placed in line over the top of one joist and the prongs are driven into the joist with one hammer blow. Flooring can be laid before further work is done.

One nail is then driven through the bridging into each of the two adjacent joists, holding the bridging secure. The ends of the bridging then are bent around the base of the joists and prongs are driven into place.

Strength of the bridging in tension is reported to be 2000 lb. Dravo Corp., National Dept., 1203 Dravo Bldg., Pittsburgh 22, Pa.

GLASS LOUVRE WINDOWS

VentiLite glass louvre windows are designed to be left partly open when it is raining to retain ventilation.

Solid extruded aluminum frames are of highly tempered alloy, and ¼-in. plate and heat absorbing glass is used for the 3 in. louvres.

All louvres move inside the frame assembly for added compactness and rigidity, and the turn control operating a worm gear locks automatically in any position to provide the desired amount of ventilation.

Joints are welded by a process designed to prevent rust or corrosion. All working parts are made of polished stainless steel.

Windows are made in both standard and special sizes for all types of construction. Midwest Louvre Lite Co., 2040 West Washington Blvd., Chicago, Ill.

(Continued on page 192)

In New Home Office of
John Hancock Mutual Life Insurance Company of Boston

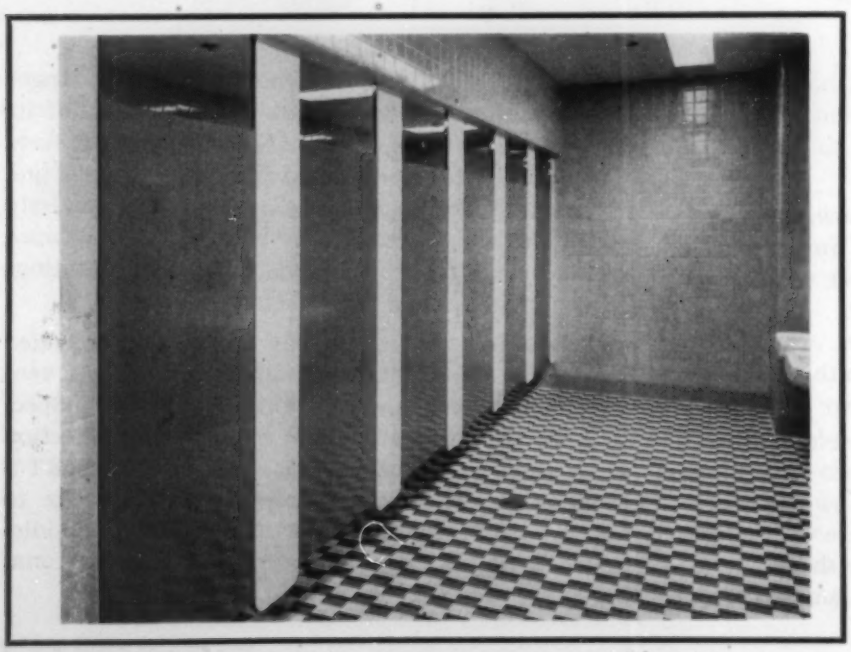
Serving 8,500,000 policyholders, this multi-million-dollar office building provides air conditioned, sound-proofed, ideal working areas for more than 5,000 workers.

FERROMETAL
FLUSH STEEL DOORS

Match the architectural beauty of modern washrooms

Reflecting new developments in washroom design, beauty, quality and utility, Washrooms throughout the new John Hancock building use the modern Ceiling Hung partitions with FERROMETAL Flush-Type Doors. Note the attractive, smoothly-flush front surface, the lustrous hand-rubbed finish and absence of visible hardware, as well as the free floor area, for easy sanitation.

For beauty and top quality in washrooms, recommend, specify FERROMETAL Doors and Partitions for all applications.



FERROMETAL Division
MILWAUKEE STAMPING CO.
841-P South 72nd Street Milwaukee 14, Wisconsin
OUR 56TH YEAR OF QUALITY PRODUCTION

STUYVESANT TOWN
(foreground)
and PETER COOPER VILLAGE

IRWIN CLAVAN - *Architect*

STARRETT BROS. & EKEN, INC., *Builders*

In Stuyvesant Town Apartments (as well as in Peter Cooper Village and Riverton, its sister projects) Fabron was used for all lobby wall decoration. As in every income producing, investment type of building, maintenance expense here is an important budgetary factor. Through Fabron, the management will realize important savings in upkeep for many years to come.

THOMAS AIRVIEWS

Metropolitan Life's Stuyvesant Town selected FABRON Wall Coverings for beauty *plus* durability

CONFIDENCE in FABRON's ability to render long range service with greatest economy is indicated by its specification for all lobbies of Stuyvesant Town, the new 8,755 apartment project erected by the Metropolitan Life Insurance Company in mid-town New York.

The desire for infrequent decoration led naturally to FABRON for, as well as being completely washable, FABRON's sunfast lacquer colors will neither scale nor peel. In addition, FABRON's sturdy canvas-plastic backing strengthens the plaster . . . prevents cracks . . . saves on expensive plaster repairs.

FABRON's broad range of colors and patterns (there are more than 180) affords a decorative latitude unmatched by conventional interior finishes. Should a change in decorative scheme be desired (after 10 or 12 years or longer) FABRON will still continue to serve as a permanent wall protective medium. Its sturdy surface provides an ideal base for paint, wallpaper, or another application of FABRON; thus, unlike other wall finishes, its initial investment is not irretrievably lost.

Moreover, FABRON is the only material in the paint or decorative wall covering field whose resistance to fire spread is attested to by the label of the Underwriters' Laboratories, Inc., which appears on every roll.

If you are not familiar with FABRON, write us today on your letter-head or send the coupon below.

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the canvas-plastic-lacquer wall covering with a life span measured by the decade

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Established 1913
230 Park Avenue, New York 17, N. Y.

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FREDERIC BLANK & CO., INC., 230 Park Avenue, New York
Please send us samples of Fabron and information concerning its use in:

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☐ Restaurants ☐ Offices ☐ Apartments ☐ Residences

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Address .....
City & Zone ..... State .....

ARII-49

(*Continued from page 190*)

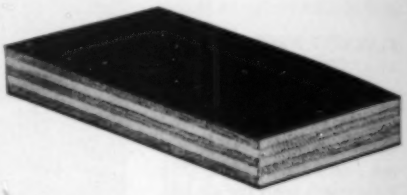
PLASTIC-FACED PLYWOOD

Repeated re-use and reduction in the amount of finishing required are two major cost-saving features claimed for *G-P-X* plastic-faced plywood panels for forms in monolithic concrete construction of floors and ceilings.

The plywood is made of Douglas fir veneers, bonded with waterproof phenolic resin adhesive, and surfaced with a plastic material on both sides. The plastic is applied during the bonding process under extreme heat to become part of the plywood itself.

Because it has a glossy-smooth plastic surface, G-P-X is said to be unaffected by heat or rain and to be highly resistant to moisture, oil, alcohol, organic solvents, hydrocarbons and greases as well as vermin, marine borers, mold and fungi.

The panels are made in a standard size 4 by 8 ft. in five thicknesses of 5/16, 3/8, 1/2, 5/8 and 3/4 in. Smaller panel sizes are produced for special construction problems. Georgia-Pacific Plywood & Lumber Co., P. O. Box 909, Augusta, Ga.



Plastic-faced plywood for concrete forms gives smooth surfaces, can be used again

TRANSLUCENT PANELING

For decorative interior applications in commercial as well as residential buildings, *Glassite* is a new translucent paneling described as light in weight, durable and easy to install.

The panels, constructed of wood and plastics by a special process, are produced in five standard sizes, 1¼ in. thick, in crystal clear, rose, blue, amber and green.

With proper openings provided in the construction to receive them, Glassite panels may be installed in single units or they may be combined and fastened together with simple millwork to make larger panels of various sizes and shapes.

Panels are available in the following sizes: 9½ in. sq.; 9½ by 18¼; 9½ by 35¾; 18¼ by 18¼; 18¼ by 35¾. Standard screen sizes vary from 18¼ by 37¼ to 35¾ by 54¾.

In addition to the ready-made panels, Glassite will soon be available in a knock-down form utilizing wooden strips notched for quick assembly of the egg-crate lattice frame which forms the base of the paneling. Display-Sales, Inc., 624 South Michigan Ave., Chicago 5, Ill.

"SAWDUST" PANELS

Resinwood, a densified product made from sawdust and other wood waste materials, utilizes a phenolic resin to bond waste wood particles into a panel board described as having natural wood color and high structural strength.

Produced by an entirely automatic process, Resinwood is turned out in panels of uniform density 8 ft. by 4 ft. by ¼ in.

The panels resemble natural pine in appearance, with a smooth surface to which paint is claimed to adhere without checking or discoloration. Resinwood

(*Continued on page 194*)

Engineered to serve 8,500,000 Americans

The imposing John Hancock Mutual Life Insurance Company building stands as a symbol of financial security for one out of every nine insured men, women and children in the United States.

COLOR • CHARACTER • PERMANENCE • LOW MAINTENANCE

These characteristics of marble contribute to the grandeur of this building and to its stability. No less than fifteen different varieties of marble, domestic and foreign, were selected by the Architects for the interior finish of foyers, lobbies and corridors. Nothing less beautiful or durable than marble would suffice.

crystalline VERMONT MARBLE

VERMONT MARBLE COMPANY • PROCTOR, VERMONT

Branch Offices

Boston • Chicago • Cleveland • Dallas • Houston • Philadelphia • Los Angeles • New York • San Francisco
In Canada: Ontario Marble Company, Ltd., Peterboro, Ontario and Toronto, Ontario
Brooks Marble & Tile Company, Ltd., Toronto, Ontario

THESE CURTIS "READY-MADES" *help you whittle down* BUILDING COSTS

When stock design woodwork achieves custom-built distinction—at lower cost—that's news for today's home planners and home builders! And that's why Curtis Woodwork is used so extensively in giving home-owners "more for their money." For Curtis Woodwork makes excellent design and quality construction available for any size or type of home. Here are a few reasons why:

You can give any room the proper focus without expensive special millwork. This Curtis mantel, for example—Design C-6040—has a pleasing simplicity which gives it dignity and beauty. Designed for Curtis by Cameron Clark, Architect.

You can see the sure touch of a master designer in this charming Curtis entrance—Design C-1730. H. Roy Kelley, Architect. Curtis entrances assure lasting value and beauty.

A fine cabinet for the home owner who wants something out of the ordinary—Curtis Design C-6515. The Architect was Russell F. Whitehead. Curtis offers 18 styles of cabinets.

A NEW Curtis Development—

PRESPINE

Developed after years of research and testing, Curtis Prespine is a new wood material for use in panels in Curtis doors and as an integral part of other Curtis Woodwork. Prespine has a hard, satin-smooth surface that takes paint and other finishes beautifully. Tough and durable, Prespine will not warp, check or splinter. It is 93% wood—and resembles in color the species wood from which it is made. Picture on right shows the beauty of Curtis doors with Prespine panels.

When in New York, visit the Curtis Woodwork Display at Architects' Samples Corporation, 101 Park Avenue.

1866 CURTIS WOODWORK

MAIL COUPON for complete information

CURTIS COMPANIES SERVICE BUREAU
AR11W Curtis Building, Clinton, Iowa
Gentlemen:
Please send me your book on Curtis Stock Architectural Woodwork.

Name.....

Address.....

City.....*State*.....

I am ( ) Architect, ( ) Contractor, ( ) Prospective Home Builder, ( ) Student. Please check.

(*Continued from page 192*)

may be drilled, sawed, planed and sanded. It is reported to have a bending strength which compares favorably with that of wood and an impact and modulous of rupture comparable to that of plywood.

The new product will remain stable in spite of moisture, heat, cold and changing temperatures, according to the manufacturer. Rock Island Millwork Co., Rock Island, Ill.

BOILER-STOKER UNIT

Boiler-stoker units with steam radiation capacities of 2190 to 8500 sq. ft. are made in 10 sizes as *Unitbilt* combinations.

The stoker ironwork is factory-installed in the boiler furnace and the stoker driving mechanism is connected after the boiler has been set on location.

Pre-installation of the hearth and retort are designed to simplify final assembly work and reduce installation time and expense.

Cleanout doors are provided in the front and rear of the base. The Brownell Co., 430 N. Findlay St., Dayton 1, Ohio.

DELINEATION SERVICE

Delineations which are the product of the collaborated skills of nine artists are available to architects throughout the country from an expanding organization in Los Angeles.

Specialists in layout, sketching, color-rendering, landscaping and other phases of delineation combine their talents to produce the presentation of the architect's work.

A complete photographic service, experienced in architectural photo-copy, matting and framing is also offered. R. C. Quale Associates, 672 So. Lafayette Park Place, Los Angeles 5, Calif.

Sample rendering by delineation service

BASEMENT INCINERATOR

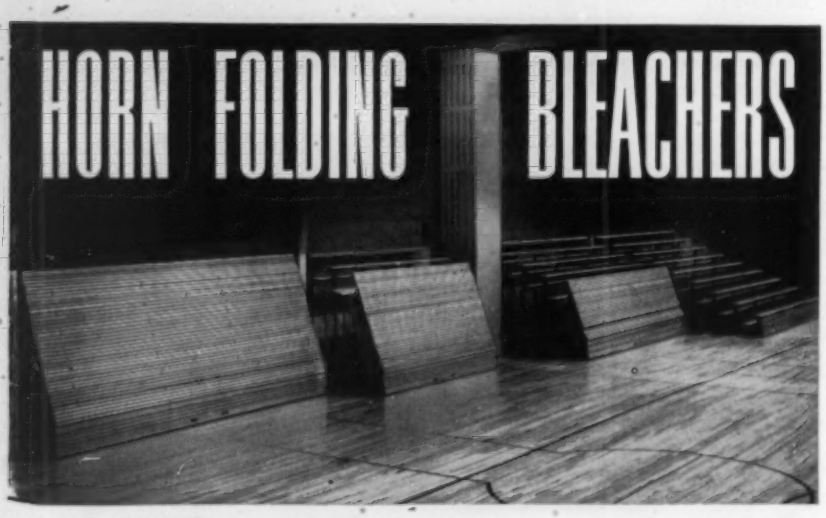
A residential basement incinerator, called the *little-Cinerator*, is said to be installed for less than half the cost for the usual type of garbage disposal unit. This incinerator is connected to the furnace flue, and may be located as close as 4 in. to a protected or non-combustible wall and not closer than 12 in. from an unprotected, combustible wall.

Jets of air enter the four corners of the unit for combustion, and firebrick walls also are said to aid combustion. Metal parts are heavy cast iron and the outer jacket is asbestos board. Quick-drying paint is available for the incinerator in a selection of popular colors. The Clear Mfg. Co., 4525 N. 124 St., Butler, Wis.

PLASTIC SEAT COVERING

A new type of plastic fabric for seat covering is said to have the outstanding advantages of being completely odorless and remaining pliable even in extreme cold. Known as *Reevon*, it is woven from Bakelite polyethylene and is resistant

(*Continued on page 196*)



Horn Folding Bleachers and Horn Folding Partitions for Greater Space Utilization

	ROWS	FLOOR SPACE IN USE	FLOOR SPACE *CLOSED	**HEIGHT
CHECK YOUR SPACE REQUIRE-MENTS	3	4 Ft. 9 In.	1 Ft. 8¾ In.	3 Ft. 0 In.
	4	6 Ft. 7 In.	2 Ft. 0⅛ In.	3 Ft. 9 In.
	5	8 Ft. 5 In.	2 Ft. 3½ In.	4 Ft. 6 In.
	6	10 Ft. 3 In.	2 Ft. 6⅞ In.	5 Ft. 3 In.
	7	12 Ft. 1 In.	2 Ft. 10¼ In.	6 Ft. 0 In.
	8	13 Ft. 11 In.	3 Ft. 1⅝ In.	6 Ft. 9 In.
	9	15 Ft. 9 In.	3 Ft. 5 In.	7 Ft. 6 In.
	10	17 Ft. 7 In.	3 Ft. 8⅜ In.	8 Ft. 3 In.
	11	19 Ft. 5 In.	3 Ft. 11¾ In.	9 Ft. 0 In.
	12	21 Ft. 3 In.	4 Ft. 3⅛ In.	9 Ft. 9 In.
	13	23 Ft. 1 In.	4 Ft. 6½ In.	10 Ft. 6 In.
	14	24 Ft. 11 In.	4 Ft. 9⅞ In.	11 Ft. 3 In.
	15	26 Ft. 9 In.	5 Ft. 1¼ In.	12 Ft. 0 In.
	16	28 Ft. 7 In.	5 Ft. 4⅝ In.	12 Ft. 9 In.
	17	30 Ft. 5 In.	5 Ft. 8 In.	13 Ft. 6 In.
	18	32 Ft. 3 In.	5 Ft. 11⅜ In.	14 Ft. 3 In.
	19	34 Ft. 1 In.	6 Ft. 2¾ In.	15 Ft. 0 In.
	20	35 Ft. 11 In.	6 Ft. 6⅛ In.	15 Ft. 9 In.

*Dimension includes 4½ in. space between top seat and wall.
**Height in open position same as closed. For Bleachers higher than 20 Rows write for complete details and dimensions.

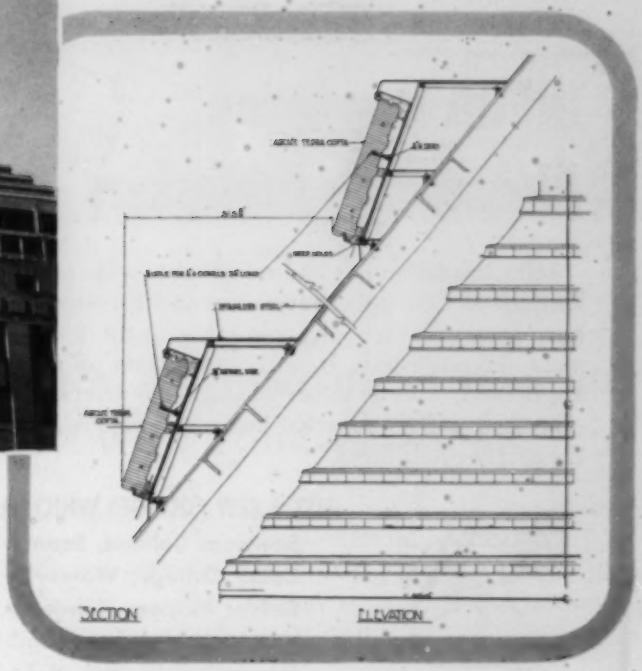
FOR SEATING CAPACITY FIGURE 16" PER PERSON. WRITE FOR COMPLETE DETAILS ON THE "3 IN 1 HORN GYM PLAN". NO OBLIGATION

HORN BROTHERS CO.
A DIVISION OF HORN INDUSTRIES
FORT DODGE, IOWA — ESTABLISHED 1909

JOHN HANCOCK MUTUAL LIFE INS. CO.
HOME OFFICE BUILDING
BOSTON, MASS.

Cram and Ferguson—*Architects*
Turner Construction Co.—*Builders*

The four elevations of the pyramid roof are a unique, colorful combination of gleaming stainless steel with bands of Enduro-Ashlar Architectural Terra Cotta, shaded from dark to light blue. Building is gray.



The Sky's the Limit

When You Design with

ENDURO-ASHLAR® ARCHITECTURAL TERRA COTTA

Possessing remarkable plasticity of form, color and texture, Enduro-Ashlar Architectural Terra Cotta gives free rein to your creative ability. This time-proved terra cotta will meet your most exacting requirements—severe surfaces or decorative sculpture, brilliant colors or delicate tints, individual units large or small. This is why more and more architects are specifying Enduro-Ashlar Architectural Terra Cotta—for mercantile, industrial and monumental construction, and for modernization. What's more, its fire-hardened surfaces resist weather-stain and big-city grime . . . its original richness and beauty can be retained indefinitely by simple-soap-and-water washings.

Construction detail, data, color samples, estimates, advice on preliminary sketches, will be furnished promptly without charge. Send your inquiry today.

FEDERAL SEABOARD TERRA COTTA CORP.

F S T C

10 EAST 40th STREET, NEW YORK 16, N. Y.
PLANTS AT PERTH AMBOY AND SOUTH AMBOY, N. J.

(*Continued from page 194*)

to moisture, acids, stains and vermin, according to the manufacturer. The fabric is also reported to resist scuffing and snagging and to be easily cleaned with soap and a damp cloth. Reeves Brothers, Inc., 54 Worth St., New York 13, N. Y.

HARDBOARD

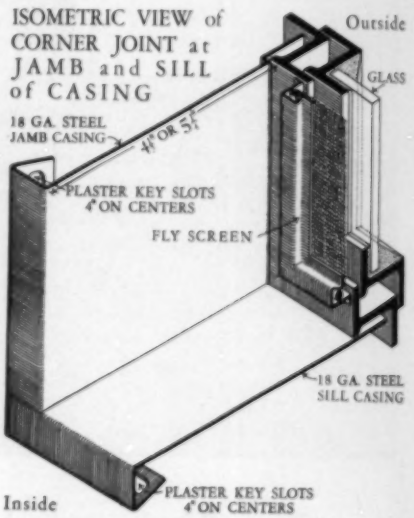
Outstanding features claimed for the new *Kimsul Hardboard* are its golden blonde color, its strength and toughness, its workability and its high moisture resistance. It is said to be suitable for both interior and exterior use.

This hardboard can be planed, sawed, glued, routed, bent, shaped or cut with punch press.

Composed of tough, resinized wood fibers, the hardboard is reported not to crack or split, not to be brittle and to be unaffected by moisture and many acids. It is available in thicknesses of 1/8, 3/16, 1/4 and 5/16 in., in 4 by 8 ft. sheets. Kimberly-Clark Corp., Neenah, Wis.

STEEL WINDOW CASINGS

Standard steel window casings are being made by Hope's Windows, Inc. to fit their standard line of steel casement windows for homes and apartments. Sixteen types are provided from 1 by 2 lights to 4 by 5 lights, in two casing depths, 4½ and 5¼ in., suitable for all types of residential construction.


ISOMETRIC VIEW of CORNER JOINT at JAMB and SILL of CASING
Outside
GLASS
18 GA. STEEL JAMB CASING
4" OR 5"
PLASTER KEY SLOTS 4" ON CENTERS
FLY SCREEN
18 GA. STEEL SILL CASING
Inside
PLASTER KEY SLOTS 4" ON CENTERS

Standard casing for steel casement window

Stool, head and jamb sections are formed from 18-gauge steel, bonderized and primed. They are assembled in the field and held in place by steel tenons which are extensions of the head and sill members inserted in the slots in the jambs and bent into holding position. An angle fin is provided, if necessary, for structural requirements. The casing affords a key for plaster and a template for plaster or masonry. Hope's Windows, Inc., Jamestown, N. Y.

FILM ON FABRICATING AND ERECTING TRUSSED RAFTERS

Available for free usage to architectural and building groups is a 16 mm motion picture covering the mass manufacture and assembly of 3,500 timber connecter equipped, trussed rafters used in the Bonhaven Apartments, Richmond, Va. The film depicts the quantity production methods used to fabricate, assemble and erect the new low-cost trussed rafter which is said to have been used in over 17,000 housing units in the last three years.

(*Continued on page 198*)

INFRA Insulation Pleases the Professors

Infra Insulation has had remarkably wide use in buildings of a long list of Colleges, Universities and Engineering Schools. They have access on their own campuses to the finest scientific talent, make thorough tests, base their selection on searching, impartial appraisal. In college after college, in test after test, Infra is selected —because Infra's superior insulating values are so quickly and decisively established.

JUST A FEW COLLEGES WHICH HAVE USED INFRA

Bowdoin College, Brunswick, Maine
Colby College, Waterville, Maine
Culver Military Academy, Culver, Ind.
Harvard University, Cambridge, Mass.
Massachusetts Inst. of Technology
Michigan State, Traverse, Mich.
Princeton University, Princeton, N. J.
Purdue University, Purdue, Ind.
Wells College, Aurora, N. Y.

Infra's multiple separated aluminum sheets provide 4 reflective spaces and 4 reflective surfaces, each non-condensation-forming. Two sheets of aluminum and the accordion partition block convection currents. Infra's triangular reflective air spaces and small mass eliminate conduction as a problem.

INFRA C FACTORS AND ROCKWOOL EQUIVALENTS

C.052 Heat Flow Down, equals 6" Rockwool.
C.093 Heat Flow Up, equals 3½" Rockwool.
C.10 Lateral Heat, equals 3 1/3" Rockwool.

WRITE

Infra for details and FREE COPY of "Bulletin No. 38," issued by the National Housing Agency of the Government, reporting tests of Aluminum Insulation made by the U. S. Bureau of Standards, and dealing principally with the problems of heat transfer and condensation.

Address Dept.
AR

MULTIPLE ACCORDION ALUMINUM & TRIANGULAR REFLECTIVE AIR CELLS

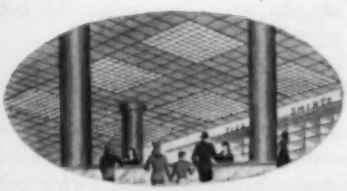
Infra INSULATION, INC.
10 Murray St., N. Y., N. Y.

New Day-Brite Four-by-Four Unit Wins High Acclaim

Architects, lighting engineers and contractors, and users have enthusiastically approved Day-Brite's new Four-by-Four Unit. Unlimited architectural possibilities, flexibility of application, and advanced integrated lighting efficiency are only a few of the reasons for a wave of orders.

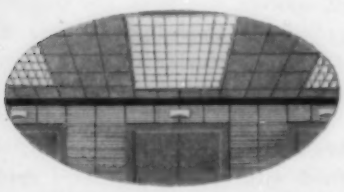
FOR OFFICES

Four-by-Four Units are engineered for both recessed and surface mounted applications. Plaster frames are available for use when fixtures are recessed.



LARGE DEPARTMENT STORES

Units are 48″ square and 9″ deep. Fixtures can be used with six, eight, or ten 40-watt fluorescent lamps. Knockouts are provided for feed connections.



ENTRANCES, LOBBIES

Exclusive Day-Brite BOXCO louver assembly has double-wall louvers interlocked for extreme strength and rigidity. Fixtures are rust-inhibited and finished in HOT-BONDED SUPER-WHITE enamel.

SMALL RETAIL STORES

Separable hinges on two sides of the louver assembly allow easy servicing. In fact, every component part of the unit is *specifically* engineered for simple, quick maintenance.

Alameda Road Shop, Singer Sewing Machine Company, Kansas City, Mo.

For example:

SINGER SEWING MACHINE IN KANSAS CITY "DRESSES UP" WITH FOUR-BY-FOURS . . .

Day-Brite Four-by-Four units, recessed into an acoustical ceiling provide a high level of cool, glareless light in Singer's Alameda Road Shop.

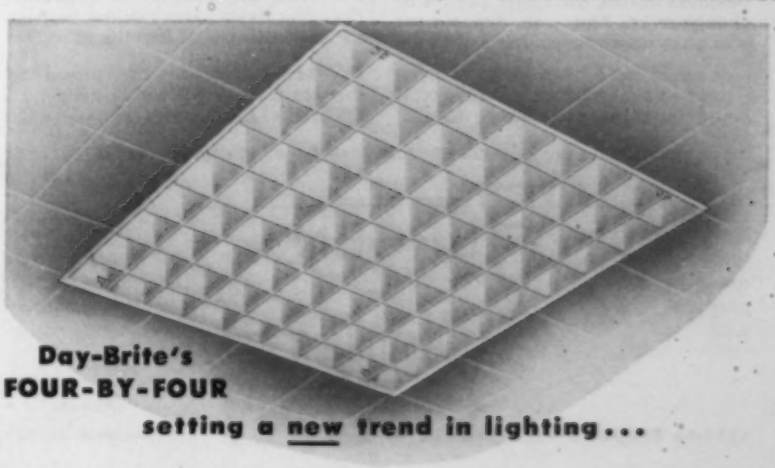
This well-distributed general lighting combines with accent lighting to point up merchandise to best advantage. Architecturally, the ceiling pattern is interesting but unobtrusive . . . attractive and smart.

Today . . . learn more about this new lighting development, its handsome appearance . . . its amazing ease of maintenance. See for yourself how Day-Brite's Four-by-Fours answer your particular lighting problem. Write now for Bulletin 20-C.

Day-Brite Lighting, Inc., 5465 Bulwer Avenue, St. Louis 7, Mo. In Canada: Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

IT'S EASY TO SEE WHEN IT'S **DAY-BRITE** *Lighting*

DISTRIBUTED NATIONALLY BY LEADING ELECTRICAL WHOLESALERS



359

(*Continued from page 196*)

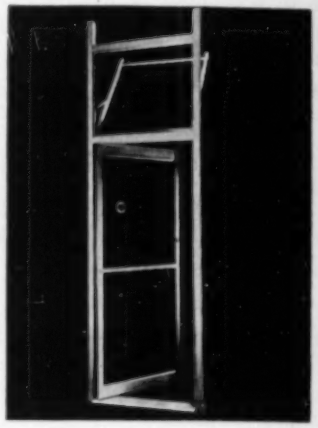
The single-reel, silent film runs for 18 min. Timber Engineering Co., 1319 18th St., N.W., Washington 6, D. C.

BLANKET INSULATION

Blanket-type insulation now being made by Kimberly-Clark Corp. features an aluminum foil vapor seal cover, designed to reflect heat and shut out condensation. A thick blanket of specially treated fibers is bonded firmly to the aluminum cover. The insulation also features strong tacking flanges to facilitate installation and comes packed to 1/5 the installed length. Kimberly-Clark Corp., Neenah, Wis.

FLEXIBLE DOOR AND JAMB

The *Visulite* narrow stile door and jamb unit, constructed of heavy gauge, extruded aluminum, has a jamb constructed so that it can be adjusted on the job. The top rail of the jamb can be adjusted to any height desired and locked in position with set screws. The hinged fanlight can be adjusted to the jamb opening by sliding the top of the fanlight down and cutting off the excess length on the two vertical rails. The unit comes with door fitted into the jamb and all hardware installed. The units are alumilited. Martin Katz Corp., 625 Bergen St., Brooklyn, N. Y.



Aluminum door has adjustable jamb

FIRE RATING FOR PERLITE

Underwriters' Laboratories, Inc. have recently given a 3-hour fire rating to a steel column protected with *Permalite* plaster, 1 in. thick, applied on metal lath, according to the manufacturer.

A 49-lb., 10-in. square H-beam was used for the test. Diamond-mesh metal lath, furred from the column by metal lath spacers, was used. The plaster was applied 1-in. thick from the face of the lath and finished with a 1/16-in. white coat.

The plaster consisted of 3 cu. ft. of Permalite (perlite) plaster aggregate mixed with 100 lb. of fibered gypsum. The complete report of the test is available from the Building Products Div., Great Lakes Carbon Corp., 18 E. 48th St., New York 17, N. Y.

COLD CATHODE LAMP, FIXTURE

A cold cathode lamp and specially designed fixture recently developed are said to possess all the advantages of custom-built cold cathode.

The fixture, designed for both commercial and industrial uses, is made of a steel body finished in white baked enamel. Porcelain, push-pull type action sockets are reported to simplify lamp replacement. Cutler Light Mfg. Co., 2026 N. 22nd St., Philadelphia, Pa.

(*Continued on page 200*)

B. ALTMAN & CO., Fifth Avenue, New York — Designer: John Mueller

BUSINESS AS USUAL
.... Only better!

Here are the facts: the whole second floor of B. Altman & Co. was completely re-equipped, the entire perimeter changed. All of this was accomplished in a remarkably short time. Every department was kept in business during the entire period of change-over. Not one department was shut down, even for a minute.

It could have been bedlam. Even worse, to a merchandise manager, it could have meant a severe loss of sales. Instead, it was "business as usual" . . . only better!

That's BERGENIZING for you. Not only aged-in-the-wood craftsmanship, but efficient down to the last detail planning by an organization that has a sales-healthy respect for the business of its clients.

When you're in the mood to modernize, don't agonize . . . BERGENIZE! It costs less, our way.

Write for our Portfolio of "Jobs Well Done." It's worth seeing

Bergen-sure the success of your modernization program with

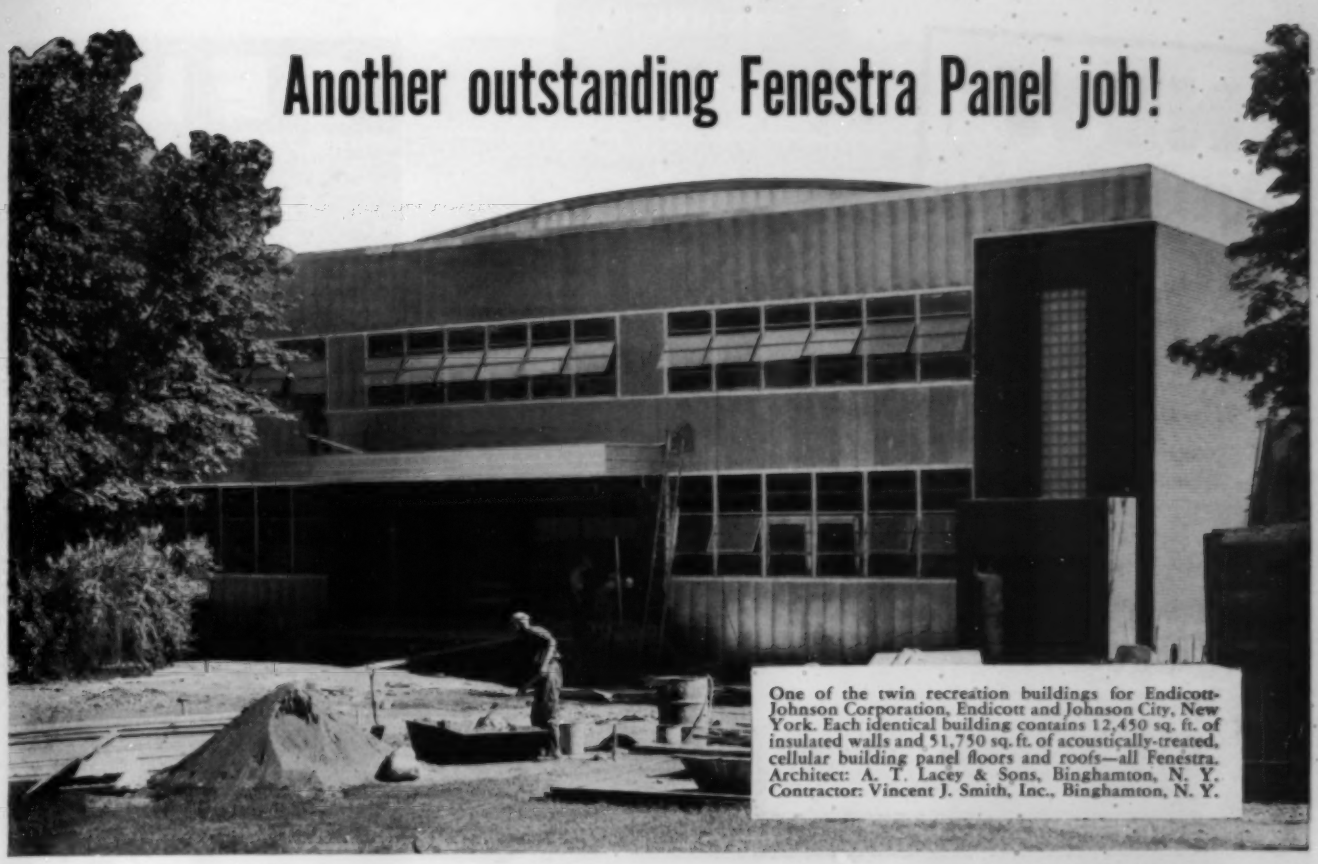
BERGEN CABINET

Architectural woodwork that makes the designer's plan an enduring reality

1552-56 BERGEN STREET, BROOKLYN, N. Y.

Phone: PResident 2-3121

Another outstanding Fenestra Panel job!



One of the twin recreation buildings for Endicott-Johnson Corporation, Endicott and Johnson City, New York. Each identical building contains 12,450 sq. ft. of insulated walls and 51,750 sq. ft. of acoustically-treated, cellular building panel floors and roofs—all Fenestra. Architect: A. T. Lacey & Sons, Binghamton, N. Y. Contractor: Vincent J. Smith, Inc., Binghamton, N. Y.

...in our 25th year of light-gage steel fabrication

You learn a lot about sheet steel fabrication in 25 years.

Steel roof deck, originated by Fenestra* Holorib in 1924, began the large scale commercial use of sheet steel as a building material. Holorib's strong pyramidal rib, full support for insulation, full last rib to eliminate asphalt leakage, telescoping end laps and interlocking side laps are features which construction men readily appreciated.

You prove a lot in 25 years, too. Holorib roofs laid down in 1924 are still good roofs—living up to their promises.

Holorib's success led us to develop new ideas, to the perfection of cellular building panels for floors, walls, ceiling and roofs—the entire enclosure.

Fenestra developed panel types D and AD with high strength-weight ratios. A maximum of material is away from the neutral axis, giving full support for fill or insulating materials, enabling you to keep quantities of those materials to a minimum. Acoustically treated, through Fenestra's perforating and adding of a sound element, they provide economical combined ceilings and roofs for schoolrooms, auditoriums and gymnasiums.

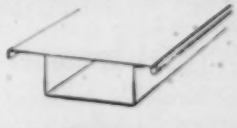
Fenestra's type C panel provides a 3-inch insulated wall equivalent to a 12-inch brick wall. These panels may be erected in vertical or horizontal position.

Fenestra Metal Building Panels are designed to reduce dead loads. They save construction time and money. Laid in long spans, they fit together easily, speedily. Fenestra floors enable other trades to move in faster—Fenestra walls speed enclosure, permit earlier building occupation.

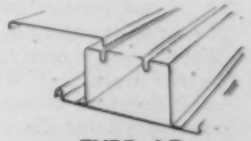
Fenestra's fund of practical knowledge on modern building technology is ready for you to tap. Get the facts. Mail the coupon.

HOLORIB

TYPE C



TYPE D



TYPE AD

*Trademark

Fenestra

METAL BUILDING PANELS

ROOFS · WALLS · FLOORS

DETROIT STEEL PRODUCTS COMPANY
Building Panels Division
Dept. AR-11, 2252 E. Grand Boulevard
Detroit 11, Michigan

☐ Please have an engineering representative call.

☐ Please send me, without obligation, information on Fenestra Building Panels.

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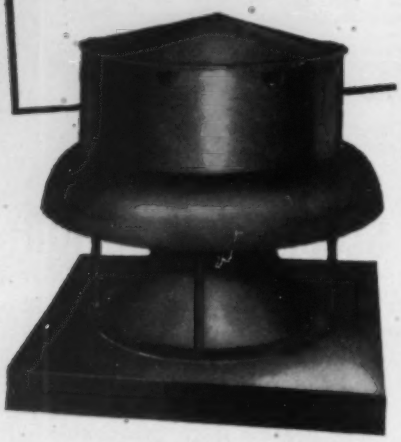
Company _____

Address _____

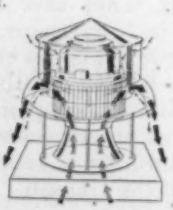
NEW
GALLAHER Air-Van Power Exhauster

- Low Silhouette. No projection above the parapet, ideal for modern architecture.
- Motor out of the air stream.
- Completely weatherproof and self contained—requires no penthouse.
- Low installation cost—direct connected.
- Positive acting squirrel-cage fan —no backdraft damper required.
- CERTIFIED RATINGS.



Designed to handle the tough jobs—entrained moisture and corrosive fumes without damage to motor. Available in special metals for special applications. Heaviest construction of any device of its kind.

Capacities 100 to 12,000 c.f.m., handles static pressure to 1¾"



No need for explosion-proof motors. Motor hood is under negative pressure so that movement of fresh air through hood prevents formation of explosive concentrations. Motors have grease-sealed lifetime bearings for reduced servicing.

For full informational bulletin, contact your Gallaher representative or write

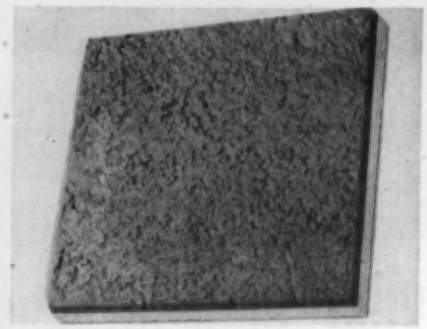
The GALLAHER Co.
4106 Dodge St. Omaha 3, Nebr.

(*Continued from page 198*)

ACOUSTICAL MATERIALS

Two new tiles and a sprayed mineral wool are recent additions to the Gold Bond line of acoustical materials.

An incombustible tile, *Travacoustic*, fabricated from rock wool and precut into uniform sizes and standard thicknesses is said to provide a high degree of sound absorption and light reflection while offering the decorative qualities of travertine stone.



Thermacoustic, sprayed mineral wool tile for noise reduction, thermal insulation

Acoustifibre, an improved wood fibre tile with hundreds of drilled perforations, is reported to offer more sound absorption per sq. ft. than earlier types. Both tiles can be repainted without loss of acoustical efficiency, according to the manufacturer.

Especially designed to be sprayed on ceilings and arches, *Thermacoustic* can be applied in any desired thickness and for both noise reduction and thermal insulation. The sprayed mineral wool is said to be fireproof and can be painted for any decorative effect desired. National Gypsum Co., Buffalo 2, N. Y.

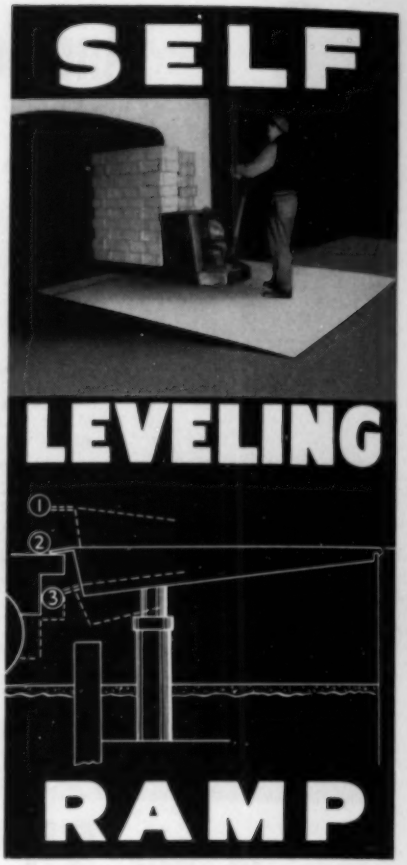
SPRINKLER HEADS

Designed for easy installation in new sprinkler systems or old, *Viking* flush-type sprinkler heads fit snugly against the ceiling, with the deflector and suspension mechanism completely concealed in a special recess inside the body of the sprinkler.

In the "on guard" position no part of the sprinkler head projects below the ceiling except the fusible link, which, in case of fire, is melted by heat and causes the deflector to drop.

(*Continued on page 202*)

SELF LEVELING RAMP



GLOBE ENGINEERED EQUIPMENT

A great time saver for your clients' loading and unloading operations. Globe Self-Leveling Ramp permits material to be wheeled directly from dock to truck, regardless of varying truck bed heights. Loads are moved faster, without hand lifting and with less breakage. Time and work savings up to 50%.

Drawing shows operation sequence of both Direct-Air and Hydraulic type Self-Leveling Ramps: (1) Ramp elevated to receive truck. (2) Truck backed into place with ramp "Lip" lowered to truck bed. (3) Ramp "riding" firmly with the truck when springs are compressed or expanded during loading or unloading.

Globe's experienced Lift Engineers will be glad to advise you on your lifting or handling problems. Suggestions or estimates are yours for the asking without obligation.

WRITE now for Bulletin A1149 showing typical installations.

LOADING RAMPS
LOADING LIFTS
PRODUCTION LIFTS
INDUSTRIAL TRUCK SERVICE LIFTS
SPECIAL LIFTS

A complete line of
GLOBE OILIFT ELEVATORS

Globe Hoist Company
DES MOINES 6, IOWA PHILADELPHIA 18, PA.

ARCHITECT: George M. Peterson, Cleveland, Ohio

SMART, FUNCTIONAL, ECONOMICAL

K&M "Century" APAC

Glamour . . . consumer appeal . . . is requisite to a project like the Bellevue Drive-In Theatre. Impressive handling of the extensive exposures is as necessary as conservation in the capital cost of material and erection. As always, the architect, builder and owner must aim for all possible permanence.

These are the complex requirements fulfilled by the use of K&M "Century" APAC on all exterior and principal interior walls of the theatre service structure, drive-in entry, and enclosure. At the same time that the large, flat, invitingly smooth surfaces of this K&M Asbestos-Cement Board were effectuating the contemporary spirit of the design, they were speeding erection, saving labor, holding down costs.

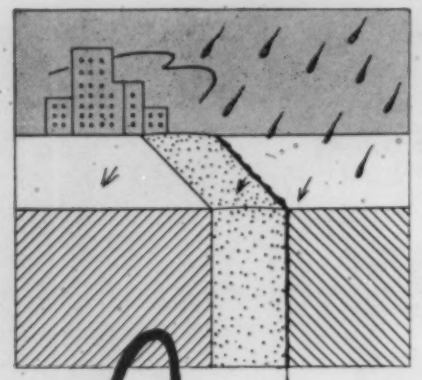
Now the owner is profiting further by many continuing economies—exceptional immunity to the widely varied weather of the locale—equal immunity to rust and rot—high safety from fire hazard, and even from termites.

Without needing so much as paint—initially or ever—K&M APAC plainly forces maintenance to the low and keeps it there. It is proving that in theatres, as in stores and residences and multi-family dwellings and all types of industrial structures, the architect is able to carry out his most advanced ideas, artistic and functional, within the economic limitations.

Nature made Asbestos . . .

Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA



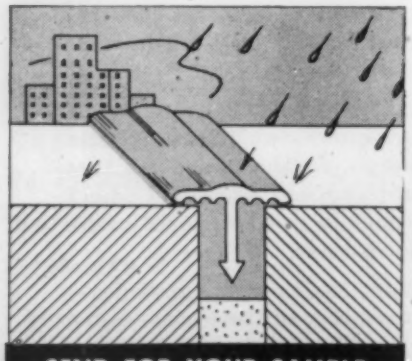
MASONRY Joints LEAK?

Specify and use

TRADE MINWAX MARK

WEATHERCAP

• For new or old structures, its use in coping and cornice joints, etc., assures years of weather-tight protection.



SEND FOR YOUR SAMPLE

Minwax Company, Inc.
11 West 42nd St., New York 18, N.Y.

Please send me free sample of Weather-cap with descriptive folder and specification data.

Name .....

Address .....

City .....

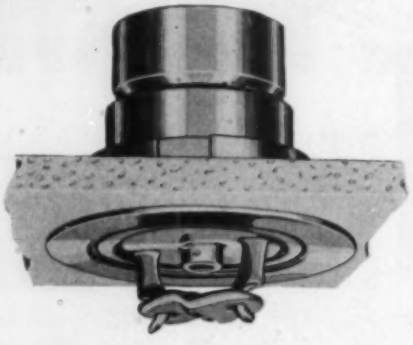
State .....

AR-11-49

(*Continued from page 200*)

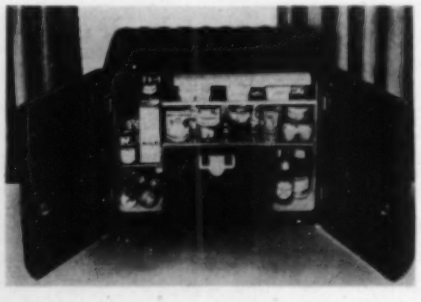
Sprinklers are finished in satin chrome over bronze. They have Underwriter's Laboratories and Factory Mutual Laboratories approval. The Viking Sprinkler Corp., Hastings, Mich.

Only fusible link of sprinkler projects below the ceiling in on-guard position



COMPACT REFRIGERATOR

An all-steel refrigerator with baked-on enamel finish in a choice of two color combinations is being offered in a unit 31 in. wide, 19 in. deep, and 25 in. high. *Freez-Pak*, which has a storage capacity of 2.66 cu. ft., is powered by a hermetically sealed refrigeration unit which operates on 115 V, 60 cycle alternating current. It has a freezing compartment for making ice which will accommodate as many as eight ice trays.



All-steel refrigerator with capacity of 2.66 cu. ft. measures 31 by 19 by 25 in.

Available either with or without a chrome-plated tubular steel stand, the Freez-Pak comes with ebony black exterior and pastel green interior or ivory exterior and interior, each with black door panels and breaker trim and chrome plated hardware. Freez-Pak Corp., 122 E. 42nd St., New York 17, N. Y.

(*Continued on page 204*)

Get ready for Winter!

INSTALL

TODD BURNERS

—GAS OR OIL

Don't let Winter unnecessarily increase your power costs. Have Todd burners—save up to 10% on your fuel and maintenance bills . . . get greater power capacity. Let skilled Todd specialists, backed by 35 years of Todd experience, engineer your boiler plant for utmost economy . . . replace your obsolete equipment . . . provide efficient new installations.

Oil Burners
Gas Burners
Combination Oil and Gas Burners

COMBUSTION EQUIPMENT DIVISION
TODD SHIPYARDS CORPORATION
81-16 45th Ave., Elmhurst, Queens, N. Y.
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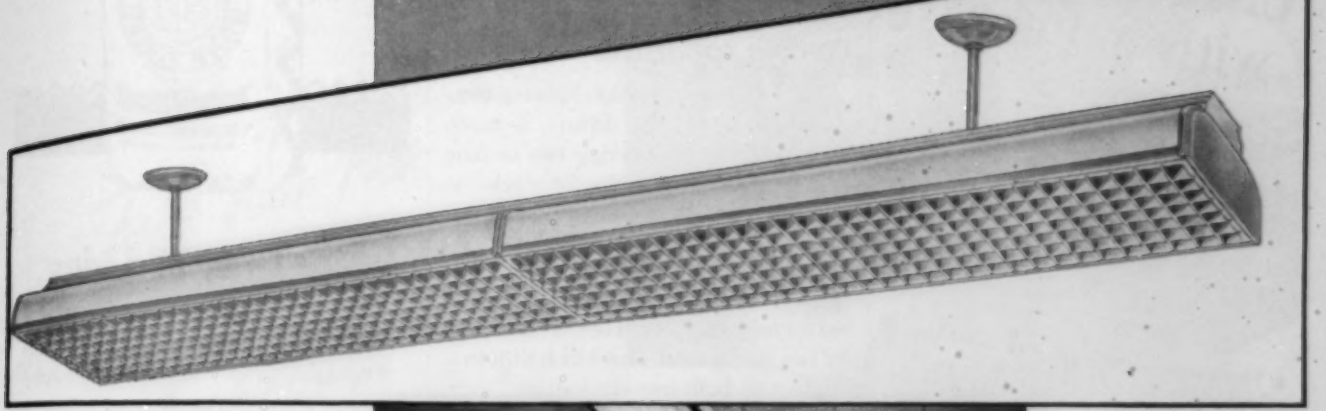
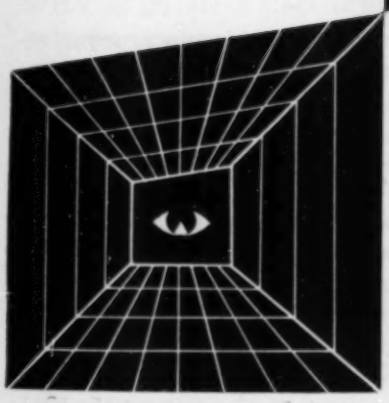
NEW MILLER HARTFORD LUMINAIRE FOR PERFORMANCE...FOR APPEARANCE



The MILLER HARTFORD luminaire is engineered for fine illumination performance. Comes in 4′ and 8′ lengths for general line and slimline fluorescent lamps.

4

Flexibility of application in ceiling or suspension mounting, individually or in continuous rows.



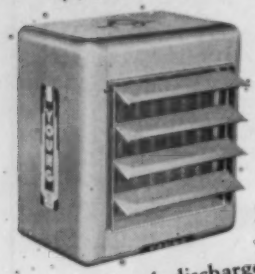
Modern in design—smartly pleasing in appearance—the new Miller HARTFORD Luminaire provides high levels of well-diffused illumination for stores, offices, schools, drafting rooms and public buildings. Reflector enclosures of Lucite, Polystyrene or metal louvers meet varied seeing requirements. Low installation and maintenance costs.

Miller Lighting Service is all-inclusive. It covers the needs of planned industrial and commercial lighting. Miller field engineers and distributors, conveniently located, are at your call. Write or wire for Miller HARTFORD Catalog.

THE miller COMPANY
SINCE 1844
ILLUMINATING DIVISION, MERIDEN, CONNECTICUT

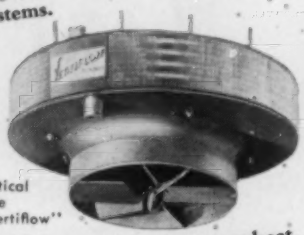
ILLUMINATING DIVISION: Fluorescent, Incandescent, Mercury Lighting Equipment. HEATING PRODUCTS DIVISION: Domestic Oil Burners and Liquid Fuel Devices. ROLLING MILL DIVISION: Phosphor Bronze and Brass in Sheets, Strips and Rolls

• • • • 3
UNIT HEATERS with a Purpose



Horizontal Type "SH"

● Horizontal discharge and adustable louvers provide a variety of heat direction angles for eliminating "cold spots." Available in 14 sizes for steam or hot water systems.



Vertical Type "Vertiflow"

● Particularly adept at delivering heat from high levels. Unique "ventilating" method prevents motor baking. Made in 7 sizes with 3 types of diffusers for regulating heat patterns.

Cabinet Type

● Adds attractive cabinet styling to unit heater performance. Quiet operating. Available in 3 sizes in each of 3 cabinet styles to meet all requirements.

For full details on one or more of these Unit Heater types mail coupon below for free catalogs.

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Heat Transfer Products for Automotive and Industrial Applications.

Young Quality

Heating, Cooling, and Air Conditioning Products for Home and Industry.

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YOUNG RADIATOR COMPANY
DEPT. 619-L - RACINE, WIS.
Plants at Racine, Wis., and Mattoon, Ill.
Sales and Eng. Offices in All Principal Cities

COMPLETE YOUR UNIT HEATER FILE WITH THESE INFORMATIVE CATALOGS

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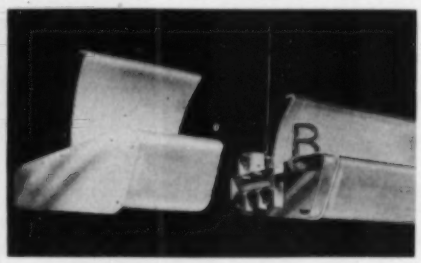
Please send me your catalog on
☐ Horizontal ☐ Veriflow ☐ Cabinet
Unit Heaters.
Name_____
Address_____
City_____ Zone____ State_____

(*Continued from page 202*)

LIGHTING FOR SELLING

Val-Lite, a combination lighting-merchandising-advertising fixture, is made in standard models having two or four 40-watt fluorescent lamps for single- or multiple-unit lighting applications.

Val-lite letters for advertising or department identification are 6 in. high, finished in bright contrasting Chinese red for high visibility. They are attached by two spring steel clips which fit into a retainer lip built into the fixture.



Letters for advertising lighting fixture fasten into retainer lip with two steel clips

Two heavy-gauge sheet steel mounting brackets are furnished with each fixture to provide support for single or continuous line installations by pipe or chandelier method of suspension.

Units are wired for 110 volt, 60 cycle, AC operation. Kent-Moore Organization, Inc. (Lighting Div.), General Motors Bldg., Detroit 2, Mich.

CURTAIN WALL PANELS

Stainless steel panels for curtain wall construction are featured in a current display at the Stainless Steel Industry Exhibit, 101 Park Avenue, New York, N. Y.

Sponsored by the American Iron and Steel Institute in recognition of the increasing interest in curtain wall panel construction for office and industrial buildings, the exhibit comprises display units of various designs submitted by leading manufacturers of stainless steel panel wall materials.

One feature of the display enables the viewer to see how a particular pattern will appear in association with other masses of stainless steel. American Iron and Steel Institute, 350 Fifth Ave., New York, N. Y.

(*Continued on page 206*)

Standards of Living

Architecture has always reflected the standard of living of its period. Today, aided by the many technical advances at our command, it is more than ever possible to raise those standards when planning living space for today's Americans.

However, for the millions who are destined to live in the low-cost housing now being planned, some long established standards are being lowered.

The standard appearance of a well plastered wall cannot be matched by means of rough carpentry. When wallboard is nailed directly to the rough framing, the resulting wall surface is no more true and even than any job of rough carpentry can be.

The standard of sound construction provided by interior plastering cannot be matched by any piece-by-piece wallboard application. Plastering makes ceilings and walls into one monolithic structure, truly constructed with the building.

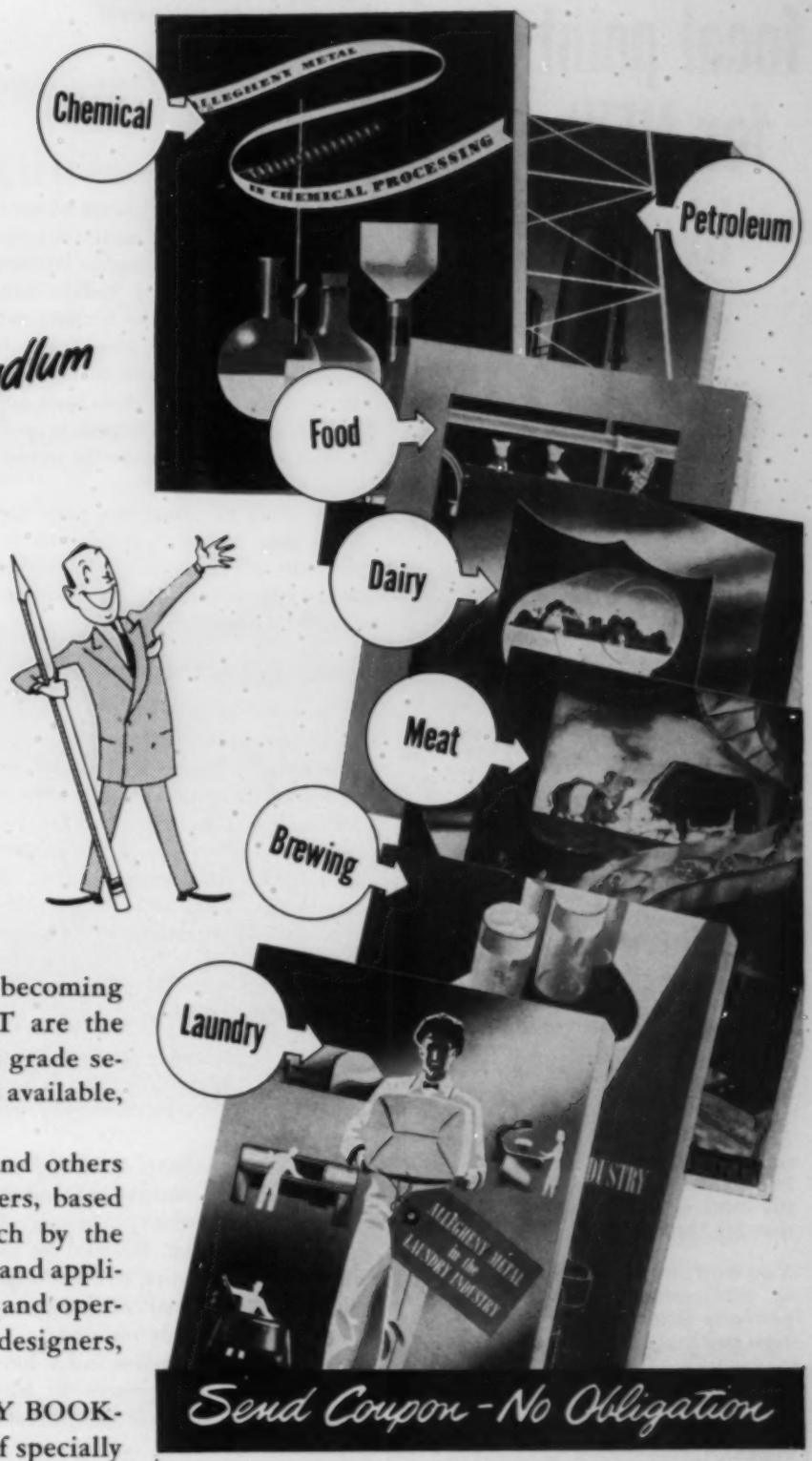
For buildings large and small, finishing lime from Northwestern Ohio has long been the accepted standard. Our twin brands: Ohio White Finish and Hawk Spread, scientifically processed from hand picked, kiln burned rock, are always of uniform good quality, 99½% pure. Easily identified by their zigzag bags, they should have your wholehearted approval. There is none better.

The OHIO HYDRATE & SUPPLY Co.
WOODVILLE, OHIO

LOOK FOR THE ZIGZAG BAGS

Take Your Pick of these Allegheny Ludlum Booklets on

Stainless in Industry



WHY is stainless steel equipment becoming so increasingly important? WHAT are the specific applications? HOW about grade selection, corrosion resistance, forms available, and fabrication?

The booklets illustrated here (and others in preparation) give you the answers, based on industry-wide data and research by the recognized authority on fabrication and application . . . valuable to management and operating men, technologists, buyers, designers, fabricators, and distributors.

Size 8½" x 11", the "INDUSTRY BOOKLETS" together contain a number of specially written articles, many pertinent photographs, charts and tables. *Mail the coupon!*

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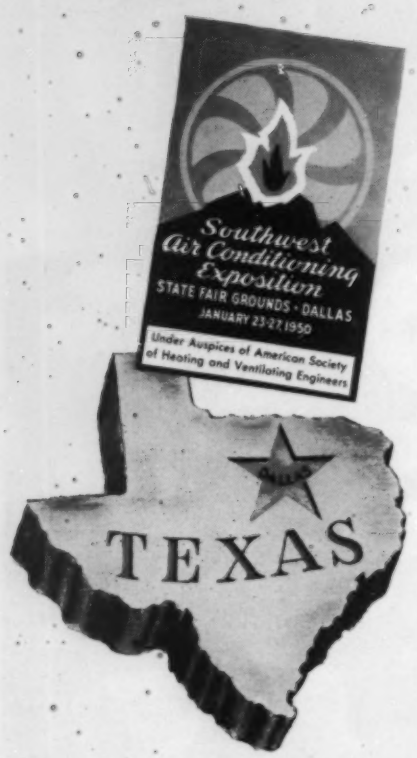
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ARCHITECTURAL ENGINEERING

TECHNICAL NEWS AND RESEARCH

(*Continued from page 204*)

CLOSET HARDWARE

The *Dexter* closet latch keeps all hardware for the closet door on the outside. In place of the usual complete latching system, there is only a friction bolt, tapered on each side of the latching end, and backed by a compression spring. It is said to be firm enough to keep the door securely latched, yet to open and close easily with a simple push or pull. The knob and rose screw to the outside of the door.

Aside from the usual face plate and striker plate mortises, installation requires only a $1\frac{5}{16}$ in. dia. hole bored 1 in. into the edge of the door. The National Brass Co., Grand Rapids, Mich.

PROJECTION SCREEN

A new fabric called *Vyna-Flect* has been developed to overcome two projection screen hazards — fire and mildew. The new fabric is vinyl plastic which has glass beads bonded to it with a thermoplastic. Vyna-Flect also is said to have longer lasting whiteness and great improvement in brilliance. Radiant Mfg. Corp., 2627 W. Roosevelt Rd., Chicago 8, Ill.

PLASTIC COATINGS

A series of protective plastic coatings for industry, *Krylon No. 200*, is now available in white, machine gray and crystal clear.

Described as resistant to fading and discoloration from sunlight or industrial fumes, Krylon 200 white can be sprayed, dipped or brushed on. Intended for use either as a prime coat or with additional coats, it is said to need only air drying.

The entire series is reported to be highly resistant to abrasion and to have good bonding characteristics to both metal and wood. Foster & Kester, Philadelphia 32, Pa.

MOLDED PIPE INSULATION

Fiberglas PF Pipe Insulation, Type 80, is designed to protect pipes at temperatures up to 800° F, a 200-degree advance over the Type 60 Fiberglas pipe insulation heretofore available.

Type 80 is made of glass fibers bonded by a thermosetting binder and molded in cylindrical form in all standard sizes up to 30 in. Owens-Corning Fiberglas Corp., Toledo 1, Ohio.

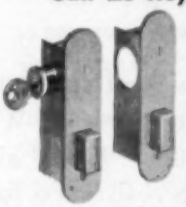
QUALITY LOCKS *from* ADAMS-RITE

THE ORIGINAL RITE-LOCK® for SLIDING DOORS

Single assembly easily installed by simple cut-out, even in narrow stiles. No mortising. 3 types fit doors 1⅛" — 2" thickness, with a ¾" wardrobe type. Thumb button emergency, 5-pin tumbler cylinder or latch type may be had interchangeably. Exterior parts solid brass. Escutcheons measure 4½" x 2⅛".

MINIMUM BACKSET DEADLOCKS FOR STANDARD CYLINDERS

Can Be Keyed to Any Job



For narrowest extruded aluminum, structural steel and wood stiles. Series 970 Deadlocks for standard cylinders have $\frac{13}{16}$" backset, $1\frac{7}{16}$" depth. Fifteen other standard backsets to $1\frac{3}{4}$". Series 980 identical except for ¾" dia. pin tumbler cylinder and $\frac{15}{16}$" backset. Rugged steel and brass construction, armored bolt with ⅝" throw, bronze or aluminum face and strike. Radius, flat and bevelled faces interchangeable.

TEMPERED GLASS DOOR DEADLOCK

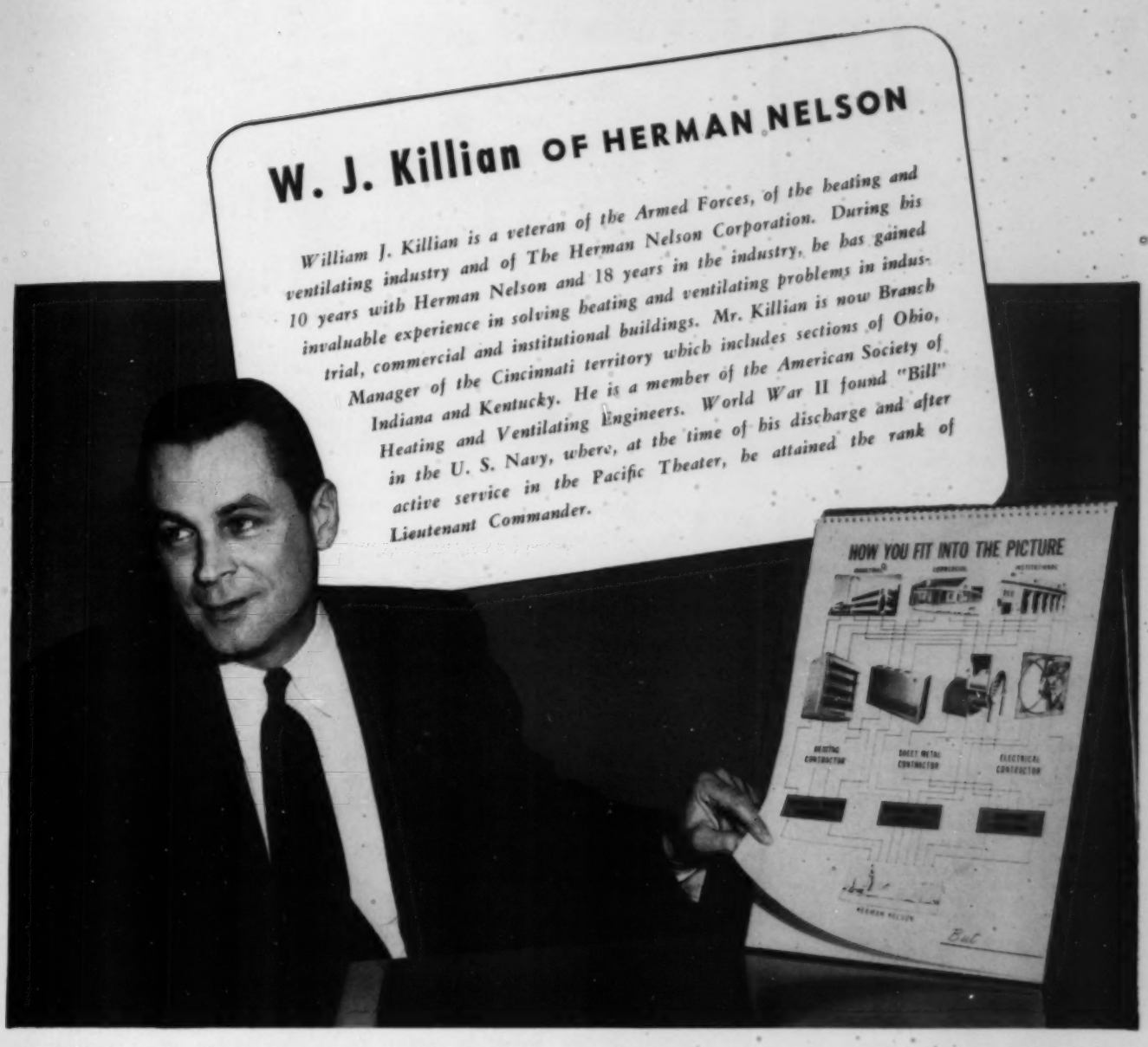
Takes the place of 2 locks. Has single or double bolts and 1 or 2 cylinders. Handle operates bolts in sequence, cylinder locks handle. Designed for and can be installed in any tempered glass door top or bottom channel. 4 sizes: 1-15/16" High x 1-13/32" Wide.

CYLINDER SLIDING DOOR LOCK

Operates by cylinder from one or both sides. Fits all standard cylinders with adapter cams furnished, (specify when using Yale or Sargent cylinder). Solid bronze face, strike & bolt. Heat treated aluminum alloy case. Use your own cylinders and trim. Also used as jimmy-proof lock.

Also — Adams-Rite Solid Brass Sliding Door Flush and Edge Pulls, Surface and Jamb Bolts and Ball Latches

ADAMS-RITE®
MANUFACTURING COMPANY
540 W. Chevy Chase Dr., Glendale 4, Calif.


W. J. Killian OF HERMAN NELSON
William J. Killian is a veteran of the Armed Forces, of the heating and ventilating industry and of The Herman Nelson Corporation. During his 10 years with Herman Nelson and 18 years in the industry, he has gained invaluable experience in solving heating and ventilating problems in industrial, commercial and institutional buildings. Mr. Killian is now Branch Manager of the Cincinnati territory which includes sections of Ohio, Indiana and Kentucky. He is a member of the American Society of Heating and Ventilating Engineers. World War II found "Bill" in the U. S. Navy, where, at the time of his discharge and after active service in the Pacific Theater, he attained the rank of Lieutenant Commander.
HOW YOU FIT INTO THE PICTURE

Seventy-five key men — including WILLIAM J. KILLIAN — work industriously, day in and day out, to provide you with clear, concise and practical solutions to your heating and ventilating problems. These men are Herman Nelson Branch Managers and Product Application Engineers. They are a carefully selected, thoroughly experienced group of men who know all phases of heating and ventilation of industrial, commercial and institutional buildings.

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There is no substitute for prompt, efficient service — which is probably one of the principal reasons why Herman Nelson has been a leader in the heating and ventilating field for nearly half a century.

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